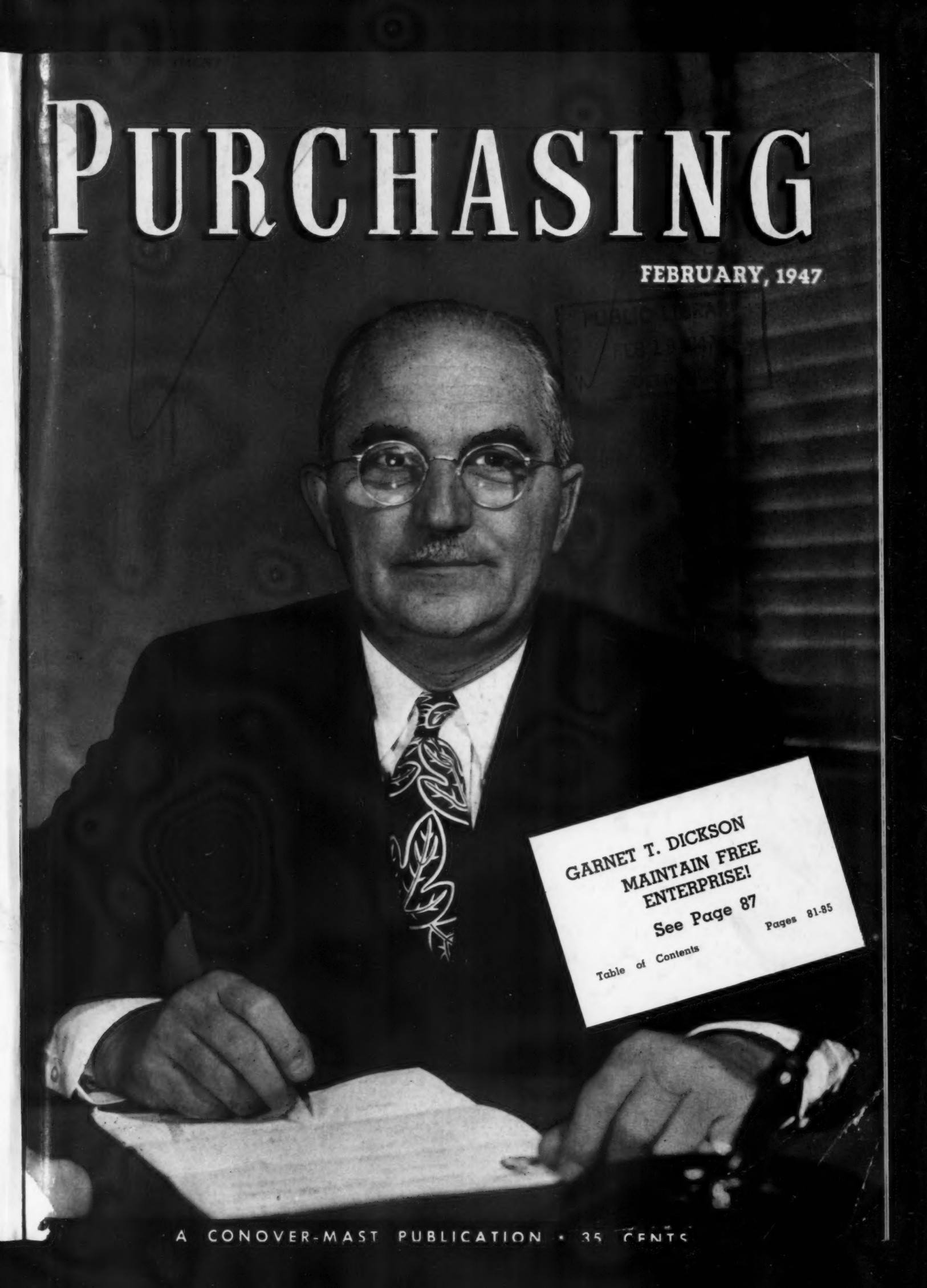
PURCHASING

FEBRUARY, 1947



GARNET T. DICKSON
MAINTAIN FREE ENTERPRISE!
See Page 87

Table of Contents Pages 81-85

A CONOVER-MAST PUBLICATION • 35 CENTS

PREVENT RUST!

The hydraulic system of a broaching machine operating 22 hours a day had to be dismantled every two weeks to clean rust and deposits from pistons and valves in order to get the machine to run smoothly and with the proper speed. After changing to Texaco Regal Oil (R & O) the same machine ran for 90 days between drain periods with no indication of trouble.

A machine tool manufacturer found, when operating one of his machines continuously day in and day out with a turbine grade mineral oil, that sludging of the hydraulic system resulted after 500-700 hours of operation. By switching to Texaco Regal Oil (R & O) he was able to increase the period between drains to 2400 hours, with no sign of gum, sludge or varnish.

PREVENT SLUDGE!

IN HYDRAULIC MECHANISMS

TEXACO Regal Oils (R & O) are designed to lick the biggest bugaboo of hydraulic mechanisms — the costly stoppages caused by rust and sludge. They are specially inhibited against rust and oxidation.

The rust inhibitor in *Texaco Regal Oils (R & O)* "plates" all parts of the hydraulic system so that moisture cannot reach and rust the metal. The oxidation inhibitor aids the oil in freeing itself rapidly of air and water and thus prevents sludge formation. In addition, *Regal Oils (R & O)* will not foam — extra assurance of smooth, dependable operation.

Leading makers of hydraulic equipment either ship their units filled with *Texaco Regal Oils (R & O)* or recommend their use. There is a complete viscosity range to assure trouble-free, economical performance from every hydraulic mechanism, large or small.

For full information, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 E. 42nd St., N. Y. 17, N. Y.

TEXACO REG. T.M.

TEXACO Regal Oils (R&O)

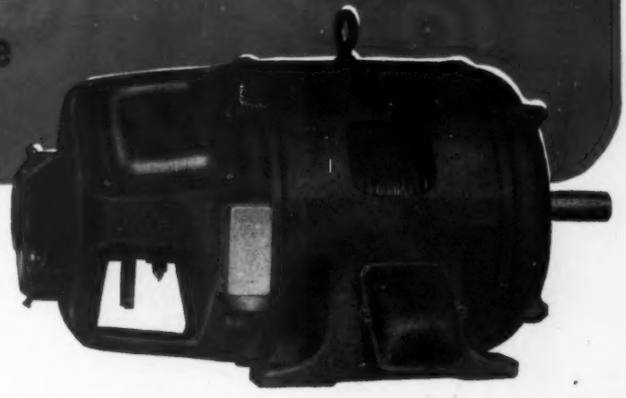
FOR ALL HYDRAULIC UNITS

Tune in . . . TEXACO STAR THEATRE presents the NEW EDDIE BRACKEN SHOW every Sunday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

Century

Slip Ring Motors

Provide Maximum Performance for Bending Rolls



- Varying Torque
- Speed Regulation
- Low Starting Current

In the installation shown here two Century Slip Ring Motors have been correctly applied. A 20 horsepower Slip Ring Motor drives the plate rolls and a 7½ horsepower motor raises and lowers the rolls to regulate the curvature of the plate that is bent.

These motors have the ability to start heavy loads with a minimum of starting current and the speed of the motor may be controlled to compensate for varying thicknesses of metal plate.

Another advantage of Slip Ring Motors is that the direction of rotation may be readily reversed when application requirements make it necessary.

Century motors are built in a wide variety of types, in sizes from 1/6 to 400 horsepower to meet nearly every electric power requirement. Century motors are engineered to the requirements of the machines they drive to assure top performance. Specify Century for all your electric motor requirements.

Century C MOTORS

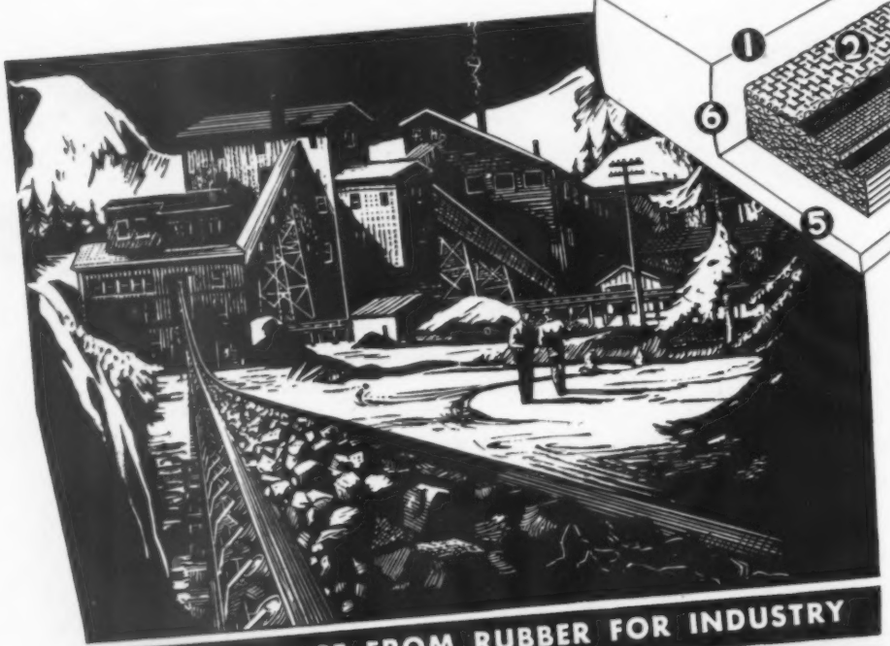
CENTURY ELECTRIC COMPANY · 1806 Pine St., St. Louis 3, Mo.

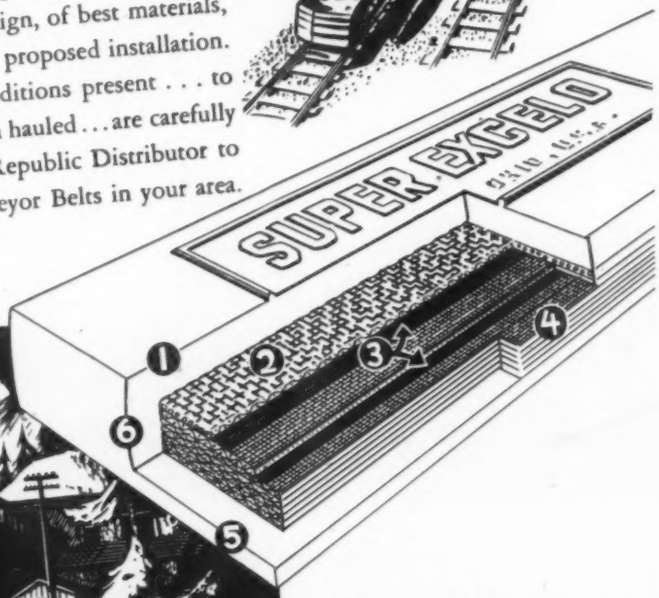
Offices and Stock Points in Principal Cities

PURCHASING, published monthly by Conover-Mast Magazines, Inc., Publication Office, Orange, Conn. Editorial and Executive Offices 205 East 42nd St., New York 17, N. Y. Entered as second-class matter August 8, 1942, at the Post Office in Orange, Conn., under the act of March 3, 1879 Subscription, $3 for one year, $5 for two years in the U. S. A. Canada and Foreign $4.00. Volume 22, No. 2.

Reduced Passenger Rates

INDUSTRY'S products and materials are passengers on constant trips from one operation to another. They ride at reduced rates when they travel on Republic Conveyor Belts. The reason: Republic belts are constructed according to the most advanced principles of design, of best materials, and built for each job after thorough service studies of the proposed installation. Specific properties needed to stand up under abusive conditions present . . . to permit long, troublefree belt operation, lower cost per ton hauled . . . are carefully pre-determined and expertly built in. Ask your nearby Republic Distributor to give you actual performance records on Republic Conveyor Belts in your area.





1 Heavy duty, abrasion and cut-resisting, impact-cushioning top rubber cover. Thickness determined by individual requirements.

2 Rubber impregnated fabric breaker strip to promote adhesion of cover to carcass and localize cuts and tears.

3 Rubber skim between plies to promote flexibility and minimize permeation of moisture into fabric in event of injury to covers.

4 Load carrying carcass of plies of special-woven belt duck—rubber-impregnated—number determined by load and specific service conditions.

5 Bottom cover of same high quality, fatigue and age-resisting rubber as top cover.

6 Heavy cushion edge for protection against side-wear and intrusion of moisture.

MORE SERVICE FROM RUBBER FOR INDUSTRY

REPUBLIC RUBBER

DIVISION

LEE RUBBER & TIRE CORPORATION

YOUNGSTOWN 1, OHIO

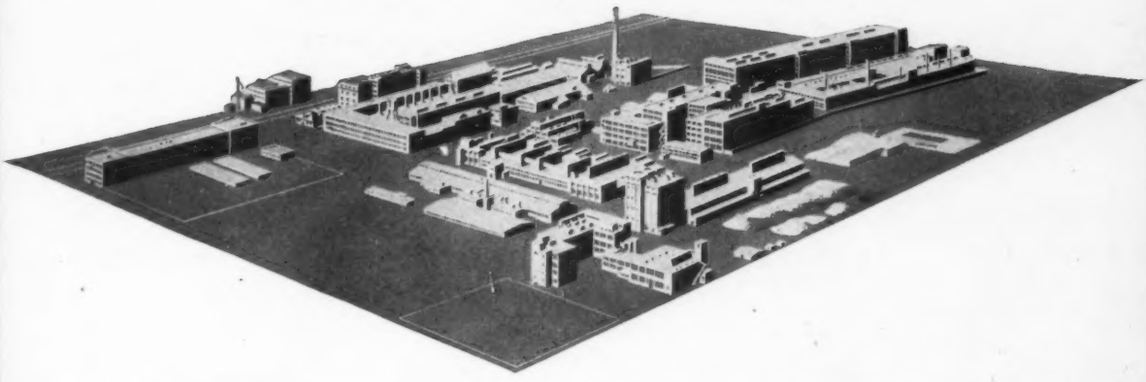
REPUBLIC INDUSTRIAL PRODUCTS
YOUNGSTOWN, O.

LEE DELUXE TIRES AND TUBES
CONSHOHOCKEN, PA.

A BUYING GUIDE FOR ABRASIVES

POINT No. 1

MANUFACTURING RESOURCES

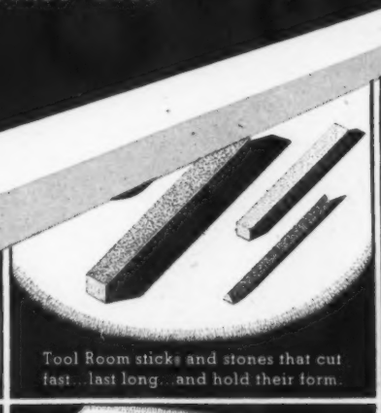


It is understandable to anyone in Production that better manufacturing resources generally lead to a superior product. Quality is not to be had for the mere wishing. The vast manufacturing facilities of The Carborundum Company are known to be an important part of the nation's industrial picture, and are pointed to as being in the forefront of manufacturing and technical progress. Not the least of the reasons for the satisfying, uniform, and dependable quality of Abrasives by CARBORUNDUM are the spacious, modern, alert and efficient manufacturing facilities which produce those abrasives. The Carborundum Company, Niagara Falls, N. Y.

CARBORUNDUM

TRADE MARK

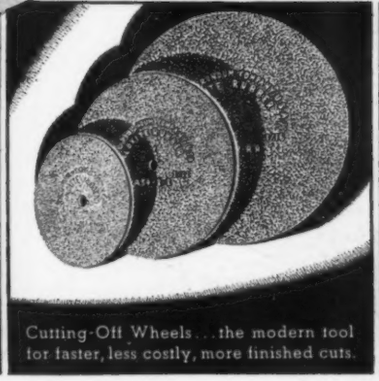
BONDED ABRASIVES
COATED ABRASIVES
ABRASIVE GRAINS AND FINISHING COMPOUNDS



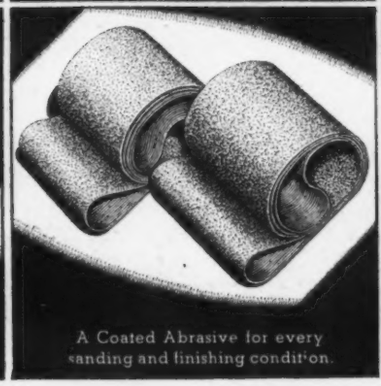
Tool Room sticks and stones that cut fast... last long... and hold their form.

Mounted wheels, in all standard grits and grades, for portable grinding equipment.

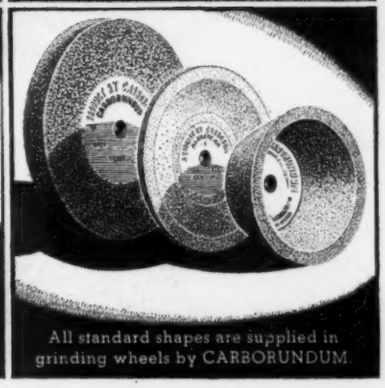
"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company.



Cutting-Off Wheels... the modern tool for faster, less costly, more finished cuts.



A Coated Abrasive for every sanding and finishing condition.



All standard shapes are supplied in grinding wheels by CARBORUNDUM.

I look for all 8 to get t.f.e.

True Fastener Economy

It is the many costs of using a fastener that count . . . not just the initial price. *True Fastener Economy* is the lowest *total* cost for fastener selection, purchase, assembly and performance.

YOU GET t.f.e. WHEN YOU . . .

1. Reduce assembly time to a minimum by savings through use of accurate and uniform fasteners
2. Make your men happier by giving them fasteners that make their work easier
3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control
4. Reduce the number and size of fasteners by proper design
5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners
6. Simplify inventories by standardizing on fewer types and sizes of fasteners
7. Save purchasing time by buying larger quantities from one supplier's complete line
8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

102 years making strong the things that make America strong

Plants at Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at Philadelphia, Detroit, Chicago, Chattanooga, Portland, Seattle. Distributors from coast to coast. By ordering through your distributor, you can get prompt service for your normal needs from his stocks. *Also*—the industry's most complete, easiest-to-use catalog.

Photographs courtesy The Erie Railroad

THE *Brushes* THAT HELP A RAILROAD KEEP *Geared for Action*

OSBORN BRUSHES ride the rails, help keep the rolling stock rolling for modern-minded Erie. In the Meadville shops alone, newly equipped with all the latest-type production and maintenance devices, brushes play an important role in department after department.

They deburr threads, clean and polish gauge cocks, globe and feed valves on air brakes. They help keep signalling and other safety equipment up to par. They're kept busy, day after day, conditioning and reconditioning welding torches—the most important single repair tool along a railroad's entire right-of-way.

When you see a railroad train, you don't think of the power brushes that help keep it rolling along on schedule. Neither do you think of brushes when you see an automobile, a typewriter or a telephone. Yet without power brushes and modern brushing techniques, all these articles (and almost any others you can think of!) would be more costly to make and maintain.

In almost every industry, Osborn brushes can help speed up manufacture, cut costs—and produce a better, more uniform, more saleable product.

Why not get the facts today as applied to your business? Without obligation, of course!

THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue *Cleveland, Ohio*

Osborn Brushes

WORLD'S LARGEST MANUFACTURER OF BRUSHES FOR INDUSTRY

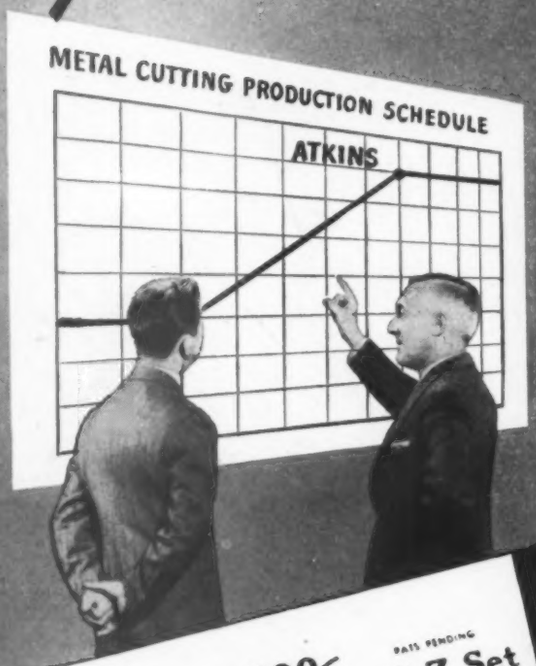
Expect the Exceptional

FROM

ATKINS

"Silver Steel"

BLADES



IMPORTANT TO USERS

Use Atkins "Silver Steel" Hacksaw Blades in connection with any tensioning device now available—they will perform with complete satisfaction.

You can scrap all previous metal cutting job standards when you switch to Atkins "Silver Steel" blades—it's a *proved* change for the better.

For one thing, it's a change-over to the *only* hacksaw machine blade with "Curled Chip" teeth. That means speedier, more accurate cutting...far longer cutting periods for every blade...higher cutting efficiency at lower costs for every metal cutting job. These are typical of many Atkins advantages—*verified* by actual case studies* in leading plants.

But most important, you can *know* in advance what savings a change to Atkins offers *you*. Just say you want an actual demonstration of Atkins cutting superiority on material you choose—an Atkins Cutting Engineer is ready to help. *Write for details today.*

*(Typical reports, of many on record, available on request.)

ATKINS "Silver Steel" FILES

Atkins Files are not ordinary files, but products worthy in every respect to carry the Atkins name. Each is made of famous "Silver Steel"... heat-treated to assure sharper cutting for a longer time... rigorously tested to certify final perfection. There's an Atkins "Silver Steel" File to meet every need.

See Your Industrial Supply Distributor or Write to:

E. C. ATKINS AND COMPANY

Home Office and Factory:
402 South Illinois Street, Indianapolis 9, Indiana
Branch Factory: **Portland, Oregon**
Branch Offices: **ATLANTA • CHICAGO • MEMPHIS**
NEW ORLEANS • NEW YORK • SAN FRANCISCO

ATKINS

ATKINS BLADES TAKE THE "HACK" OUT OF HACKSAWING

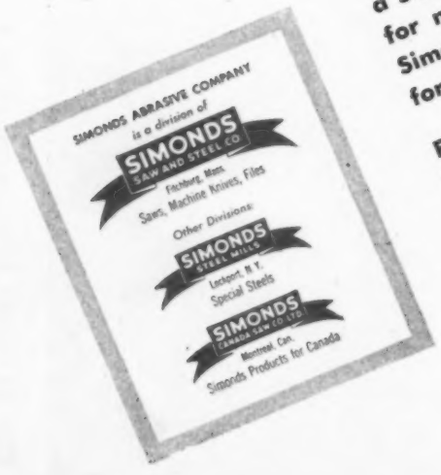
VIEW OF FORMER GOVERNMENT OWNED BLAST FURNACE PLANT BOUGHT BY INLAND

This plant was originally built and operated by Inland for the government to produce additional iron for war purposes. It covers 50 acres adjoining Inland's Indiana Harbor Works, and The purchasing agreement provides that Inland shall produce merchant pig iron for the veterans' housing program for a period of time. Later on, however, it will form the basis for an increase in Inland's overall steel capacity.

RULE OUT *Wasted time*

Too narrow a face on a grinding wheel can mean too much time on the job. Why use a wheel with a 1″ face, for instance, when one with a width of 1½″ to 2″ can increase surface contact 25 to 50%? This time saving efficiency is yours in the complete line of Simonds Abrasive wheels. Whether for rough snagging or for precision finishing there is a Simonds wheel to measure up to your most exacting requirements for maximum production with speed and efficiency. A copy of the Simonds Abrasive Data Book is available to guide your selection. Write for yours today.

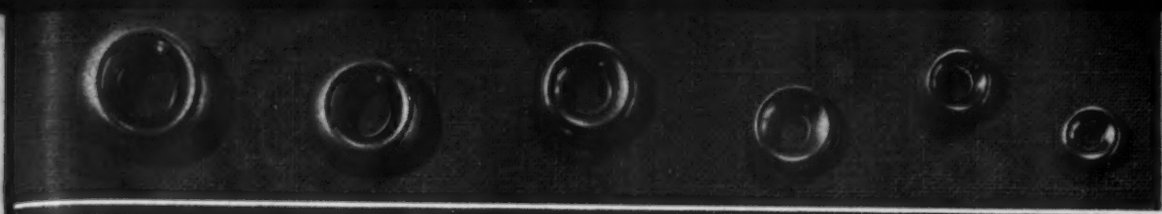
For assistance in requisitioning consult Simonds Abrasive distributors located in all principal cities.



SIMONDS ABRASIVE CO.
PHILADELPHIA

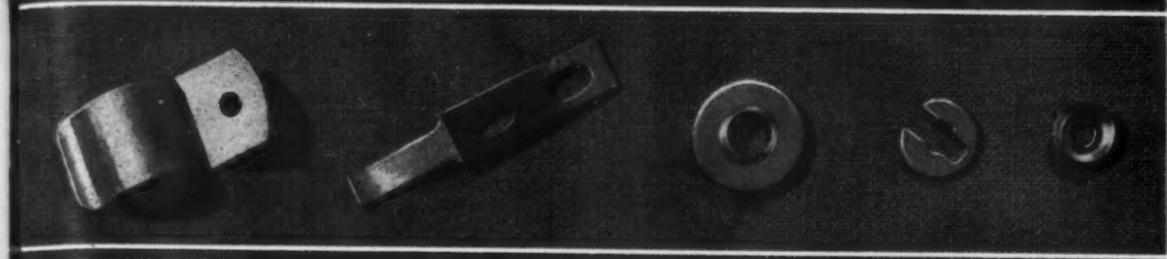
SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.

DISTRIBUTORS IN ALL PRINCIPAL CITIES



FINISHING WASHERS

Diamond G makes a full line of hea
and flush type finishing wash
Available in all finishes and type
metals.

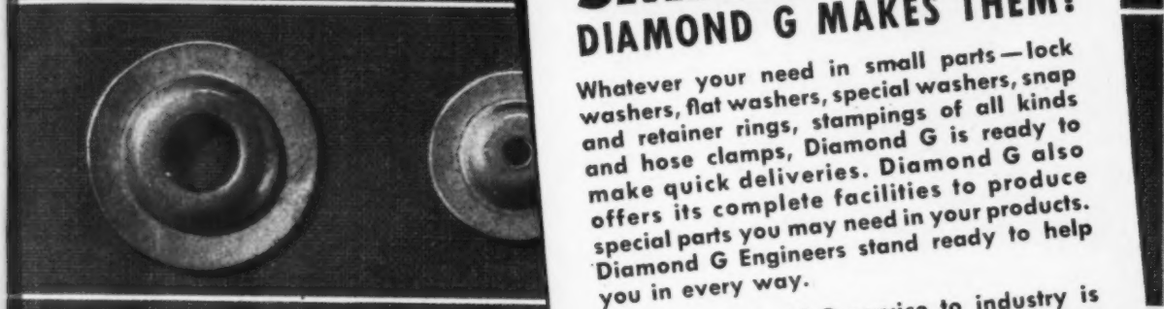


SPECIAL WASHERS AN STAMPINGS

A complete range of sizes are av
able in Diamond G special "C" wa
ers. Unusual stampings of all ki
produced in Garrett's modern sta
ing plant which turns out million
stampings.

SPRING STAMPINGS

Garrett's modern facilities for sta
ing and precision heat treating m
it possible to produce spring sta
ings of the highest quality. Produc
special spring stampings to e
specifications in an amazingly s
period of time is a specialty
Garrett's.



SMALL PARTS
DIAMOND G MAKES THEM!

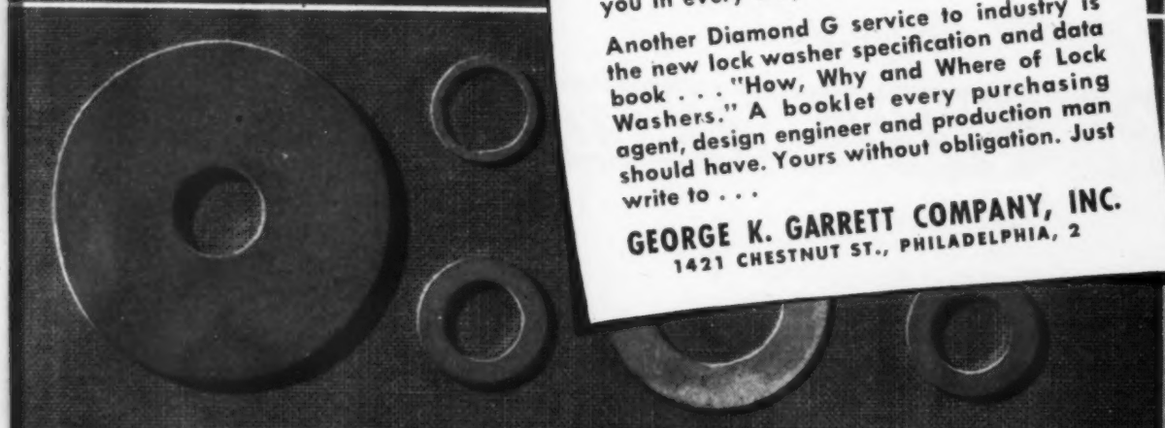
Whatever your need in small parts—lock washers, flat washers, special washers, snap and retainer rings, stampings of all kinds and hose clamps, Diamond G is ready to make quick deliveries. Diamond G also offers its complete facilities to produce special parts you may need in your products. Diamond G Engineers stand ready to help you in every way.

Another Diamond G service to industry is the new lock washer specification and data book . . . "How, Why and Where of Lock Washers." A booklet every purchasing agent, design engineer and production man should have. Yours without obligation. Just write to . . .

GEORGE K. GARRETT COMPANY, INC.
1421 CHESTNUT ST., PHILADELPHIA, 2

SPRING WASHERS

Diamond G has built an outstand
reputation for producing a wide v
ety of spring washers. They a
manufacturers an excellent source
supply for special shaped, curv
dished and cupped spring wash



FLAT WASHERS

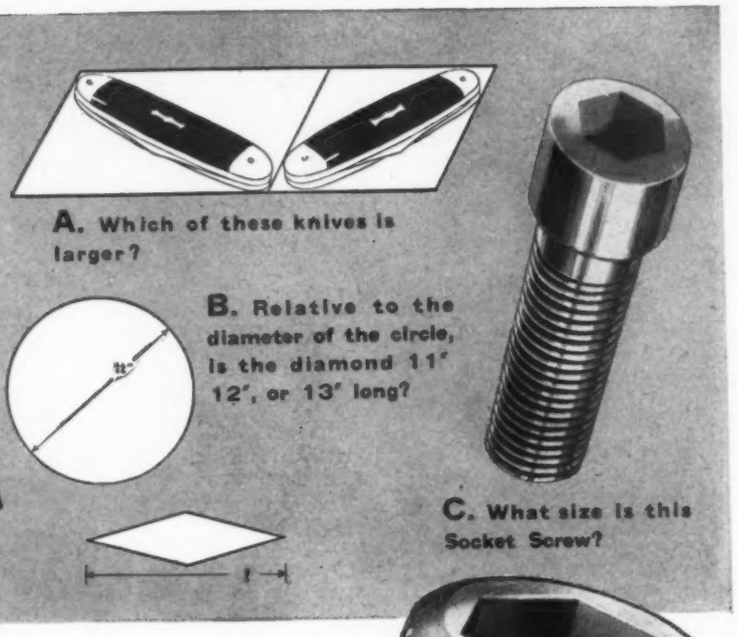
Outstanding in the Diamond G l
of products are the many flat wash
made by Garrett's. It offers industr
quick and dependable source of
complete line of flat washers incl
ing SAE, machine-screw, and s
craft washers in all sizes, thickne
metals and finishes. Garrett's a
produce a complete line of sm
space and retainer rings for all typ
of industrial installations.

HOSE CLAMPS

Garrett's line of hose clamps inclu
both types to provide the manuf
turer with the answer to his proble
The Diamond G Multi-Clamp is t
ideal clamp of a thousand u
which can be used on automoti
hydraulic, pneumatic, electronic a
aviation installations. The Diamo
G Auto-Seal Clamp is truly the a
purpose economy clamp for every
dustrial use . . . is rugged and p
vides a tight seal on every joint.

DIAMOND PRODUCTS

Can YOU Guess Right on Size?


A. Which of these knives is larger?
B. Relative to the diameter of the circle, is the diamond 11" 12", or 13" long?
C. What size is this Socket Screw?

GUESSING is fun in a game . . . but there's no place for it in shop practice. Wrong guesses cost money . . . and they happen more often than you think. For example, the size and thread pitch of the socket screw above was guessed wrong by many veteran shop men questioned in a recent test. On the job . . . such mistakes waste time.

There's no need to guess...

WHEN IT'S SIZE-MARKED

Just a quick glance at the head of any P-K Cap Screw reveals its size. Clearly incised, easily read, the Size-Mark represents a big forward step in the simplification of assembly operations.

Experienced men like the Size-Mark because it saves their time. Green hands are all for it because it protects them from errors. Tool crib bosses want it because it speeds up the sorting of left-over, mixed-up screws. And the men who service your products will appreciate the Size-Mark because it saves their time on reassembly jobs.

Are you missing this opportunity to aid your assembly workers – to speed up assemblies – and to provide an extra sales feature for your product?

Plus **– GEAR GRIP***

Gear Grip on Size-Marked Socket Head Cap Screws is a further aid to fast work . . . makes them slip-proof even when fingers are oily. Write today for samples . . . Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.

ANSWERS:

A. Both are the same. **B. The diamond is 13" long.**
C. There's no question when it's P-K Size-Marked!

* U. S. Pat. No. 126,409

ANOTHER P-K FIRST

GROUND THREAD

Socket Set Screws

● Smooth, mirror-bright, clean finished threads – centerless ground on hardened blanks. Accurate contour and lead, dependable Class 3 Fit. Free from imperfections common to ordinary cut thread set screws . . . a "shining example" of good workmanship. Ask for samples. You'll see the difference.

P-K SOCKET SCREWS ARE AVAILABLE FOR PROMPT DELIVERY!

Send for Stock List Now

SOLD ONLY THROUGH ACCREDITED DISTRIBUTORS

PARKER-KALON *Cold-forged* SOCKET SCREWS

Have you a *finger-tester* in your plant?

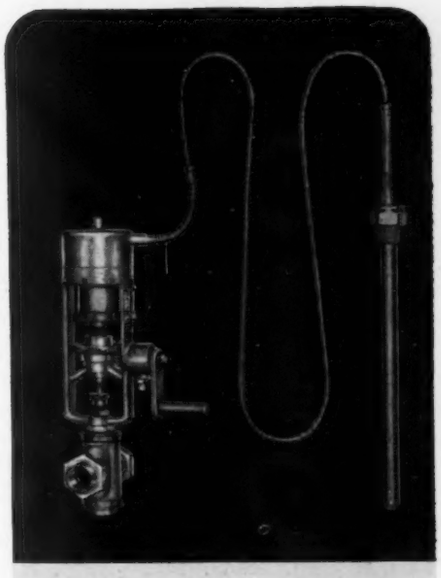
—save his skin and your product with Sylphon temperature regulators

● The digit is a sensitive device. It can tell hot from cold easily and quickly. But that isn't enough for foods, textiles, chemicals which must sell in a highly competitive market.

The processing of today's products demands controls so accurate that one batch or one piece will be exactly like another. That's the way reputations for quality are built and maintained. That's the way consumer demand is created and preserved . . . even in a seller's market.

Fulton Sylphon has developed a line of dependable, self-powered temperature regulators to help you take process control out of the guessing stage. Skillfully designed and constructed for long, trouble-free service, they cost you little, repay you generously.

For complete information, write today on your business letterhead for Bulletin No. CO-20.



Temperature Regulator No. 923-Q, typical of the Fulton Sylphon line, was specially developed for controlling process temperature. Also available with fin type bulb for controlling temperature of air and gases. Crank permits quick, easy adjustment of settings.

FS

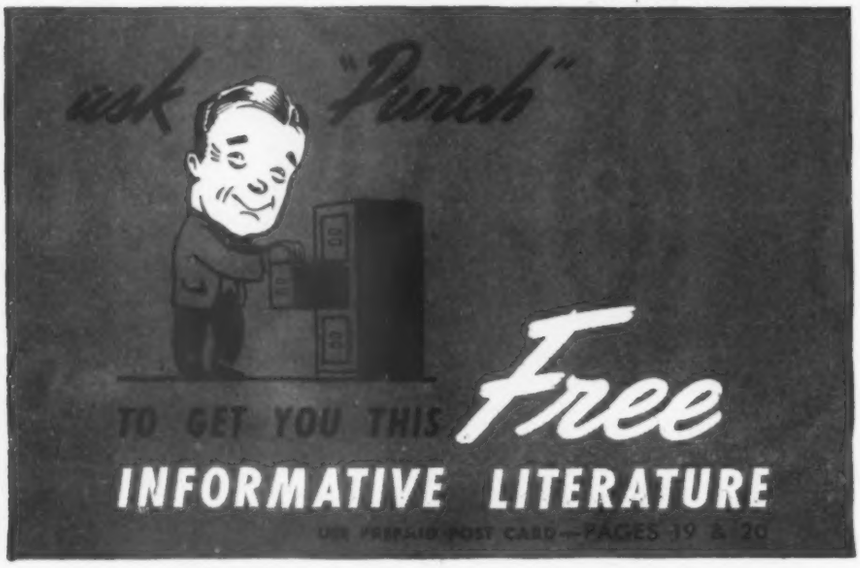
FIRST WITH BELLOWS

THE FULTON SYLPHON CO. KNOXVILLE 4, TENN.

FULTON SYLPHON

Temperature Controls • Bellows • Bellows Assemblies

Canadian Representatives, Darling Brothers, Montreal



☐ **1. PACKING & SEALING MATERIAL**—"Vistex", a sheet laminated felt-base packing and sealing material, is subject of Data Sheet No. 14 available from American Felt Co. It explains applications where positive sealing and self-lubricating are required. It also gives suggestions on selection of best type of Vistex—Hycar, Neoprene, Buna S, or natural rubber—for any particular application. Property-index table covers principal characteristics.

☐ **2. CONTROL WAVES**—"Pneumatic Control Valves and Controller Accessories" is title of 36-page bulletin 277-1 published by Foxboro Company. Features include color page identifying enamel finishes offered on Stabiflo Valves, corresponding with color code of the American Standards Association. Appendix contains information on computing valve sizes, with tables and formulae for determining the size of the correct valve for a contemplated installation.

☐ **3. BEARING-POURING CHART**—"How to Pour Bearings" is title of illustrated wall card issued by Joseph T. Ryerson & Son, Inc. Six cartoon-type pictures illustrate steps necessary to secure good, tightly lined bearings. Instructions are printed on card stock suitable for hanging in shop. How many can you use?

☐ **4. SCREWS, BOLTS, ETC.** — Complete details, specifications, etc., on line of cap and set screws, bolts, pipe plugs, hexagon keys, studs, nuts and taper pins are listed in Western Automatic Machine Screw Co. catalog entitled "Western Screws". It contains 21 pages of photographs, diagrams, charts and tables.

☐ **5. CONTOUR MACHINE** — "DoAlls on Production" is title of 88-page illustrated record of DoAll Contour Machines in actual production. Various precision production uses of the machine are profusely illustrated including: three dimensional contour sawing; short run stamping without dies; contour machining and contour sawing; continuous filing operations; and friction cutting of castings, sheet metal alloys; and high speed sawing of wood, plastics, etc. The book is an excellent educational record of the DoAll contour machine for band sawing, band filing and polishing.

☐ **6. BRACING CAR DOORWAYS (Steel Strapping)** — Method of bracing car doorways with steel strapping to protect lading, provide safety in unloading, and reduce bracing costs, is graphically shown in brochure published by Acme Steel Company.

☐ **7. OTISCOLOY**—This J&L High Tensile Steel is described in bulletin issued by the Jones & Laughlin Steel Corp. It is a high strength steel, designed to meet needs for a readily weldable and easily fabricated material, which offers the opportunity to incorporate weight-saving features in products. It shows a 40% increase in tensile strength with twice the minimum yield strength of ordinary mild steel.

☐ **8. TOOLS, DIES**—Tools, dies and wear-resisting parts made from "Malta" cemented carbide and "T and V" cast non-ferrous alloy are illustrated and described in new 24-page catalog published by Jessop Steel Co. Specifications are given for standard carbide tool tips, tools, and wire drawing dies and for "T & V" cast alloy tool bits.

☐ **9. PROTECTIVE COATINGS** — The numerous Hercules Powder Company products used in the manufacture of protective coatings are listed, according to use, in new four-page folder. Brief descriptive matter explains why a specific product is used for the indicated purpose.

☐ **10. MIDGET MAGNETIC Relays** — Designed for application in industrial, electronic and special control circuit where remote or automatic operation is required, these midget relays are described in Ward Leonard Bulletin #106. They are suitable for a-c or d-c on standard voltages and frequencies up to 125 volts, and are available with single or double pole, and single or double throw silver contacts, for two-wire or three-wire instrument control.

☐ **11. CARBIDE DIES**—Illustrated booklet No. D-120 by Carboloy Co. Inc., contains numerous time and money saving ideas for anyone connected with the deep drawing of sheet metal. It describes numerous jobs —selected to show versatility of carbide dies—such as drawing operations involving highly abrasive beryllium; ferrule and eyelet dies; dies and punches for blanking laminations out of abrasive silicon steel; drawing and cupping steel cylinders, etc. One set of dies turned out 8,000,000 pieces in one instance without having to be reworked.

☐ **12. MOLYBDENUM IN STEEL** — Thirty-page booklet by Climax Molybdenum Co. describes the effects of Molybdenum on the physical properties and fabrication qualities of various alloy steels, and discusses physical properties and application of Carbon-, Chromium-, Nickel-, Nickel-Chromium-, Manganese-, and Silicon - Molybdenum steels, Nitriding steels, and Molybdenum steels for elevated temperature and corrosion-resistant service.

☐ **13. SMALL TUBING**—Small tubing from 5/8" O.D. down in many metals are described in 4-page bulletin issued by Superior Tube Co. Types include—mechanical, aircraft, instrument and corrosion resistant tubing, and tubing for electronic products. It also gives instructions on how to order.

☐ **14. FIRE PROTECTION for Oils**—Bulletin describes the Grinnell system for extinguishing oils and flammable liquid fires with water. Various nozzles for special applications are also described and illustrated. Grinnell Co., Inc.

☐ **15. NON-METALLIC Basic Materials** — Bulletin GF 41 describes Diamond vulcanized fibre, Dilecto laminate, Vulcoid, a C-D dielectric material, Celoron, Fabric base molded plastic, Micabond, and Dilectene insulation. Continental Diamond Fibre Co.

☐ **16. LOCK WASHERS**—"How, Why and Where of Lock Washers" is title of 16-page book released by the George K. Garrett Co. It is described as "one of the most complete booklets on this subject ever issued" and in addition to explaining the "how, where and why" of uses, contains table showing ASA and SAE standards for spring lock washers.

☐ **17. STAINLESS STEELS**—Bulletin shows "Stainless Steels by Trade Names" AISI types and companies making them, also the recommended Arcos Alloy electrode for welding each type. Arcos Corp.

☐ **18. GEAR PULLERS** — Circular illustrates and describes Armstrong-Bray & Company's two-arm and three-arm gear and wheel pullers, Chaingrip pullers, and pullers for wheel hubs, electrical bearings, timing gears, refrigeration pullers, etc.

☐ **19. VALVES**—Designed to assist Purchasing Agents, engineers, production men and others in selecting the right valve for the right job, new 248 page catalog covers the Ohio Injector Company's line of steel, iron and bronze valves.

(*Continued on page* 16)

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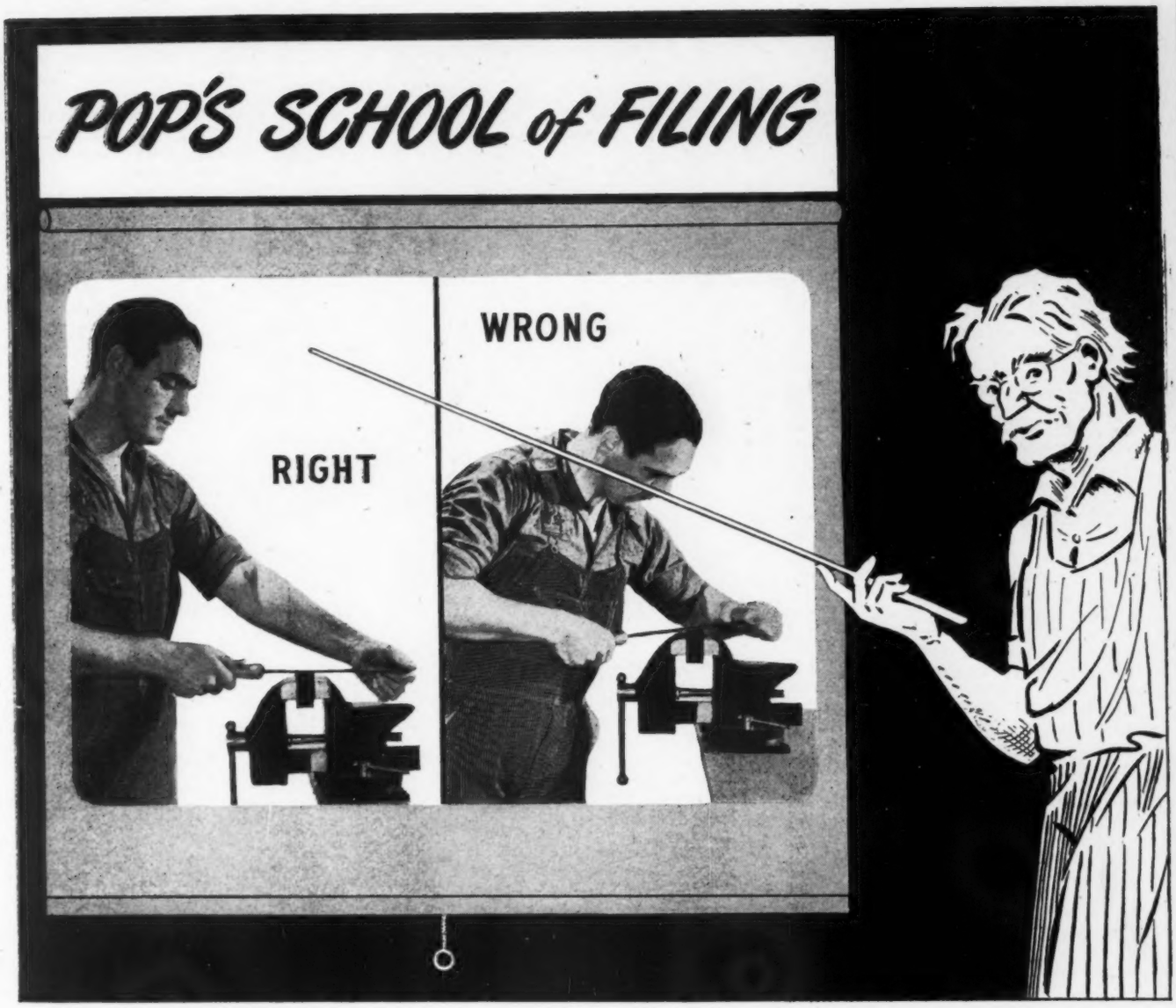

YES, Pop the Foreman is back. He's that mythical shop character who appeared in many a Nicholson wartime advertisement. Hard-bitten and sometimes hard-speaking, but always helpful, Pop is devoted to the cause of good filing—dishing out sage advice that has made many a mechanic more valuable to his employer and to himself.

Pop's peacetime "School of Filing" is now open to mechanical trainees, industrial employees, shop bosses, production and purchasing heads—to anyone, in fact. At right is his first "quiz" lesson. Pass it around, and let the answers fall where they may. Most of them will be found in the well-known Nicholson "text book," *FILE FILOSOPHY*. Pass that book around, too. Free copies for reference distribution around the plant are available in limited quantities. Tell us how many you need.

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POP'S QUIZ FOR TODAY

(Correct answers may be found on FILE FILOSOPHY pages indicated in parentheses)

1. What things is the mechanic in the "Wrong" picture doing incorrectly? (p. 30)
2. What three important things must the filer do right to do a good filing job? (p. 28)
3. What are the three elemental ways in which a file can be put to work manually? (pp. 28 and 29)
4. What is the proper height for work in vise for (a) general filing; (b) heavy filing; (c) delicate filing? (p. 29)
5. What accessories should be used for holding soft metals in vise for filing? For round pieces? (p. 29)
6. What is the most generally accepted way of holding a file for ordinary filing? (p. 29)
7. What is the proper grip for one-handed filing? (p. 29)
8. What is the proper way of "carrying" the file across the work? (pp. 29 and 30)
9. What is drawfiling and how should file be held and "carried"? (pp. 30 and 31)
10. How should file be held against work in lathe filing? (p. 31)
11. What general-purpose file is normally capable of doing good lathe-filing work? (p. 31)
12. What special file is made for lathe filing and what are its features or characteristics? (p. 31)

NICHOLSON U.S.A.

NICHOLSON FILES
for every purpose

BLACK DIAMOND TRADE MARK

(*Continued from page* 14)

☐ **20. PLASTICS**—Book of 24 pages showing plastics products made by G. Felsenthal & Sons, injection molders and fabricators, is featured by a chart which presents the characteristics of some of the most popularly known thermoplastics. Products include calibrated scales, calculators and computors, templates plotters, etc.

☐ **21. NON-SLIP SURFACES** — "Safety-Walk" is the name of a tough, weatherproof, flexible, fabric-backed non-slip material for indoor and outdoor decks, floors, ramps, walkways and stairways, product of Minnesota Mining & Mfg. Co. It is surface coated with hard mineral grains, and is available in cleats, rolls, and ¾" x 24" strips for use on stairways; colors, black, red, green. Bulletin "New Safety for Industry" shows applications in factories, plants, ramps, planes, ships, etc.

☐ **22. ELECTRIC HOIST**—The Conco Torpedo electric hoist, a rugged heavy duty hoist combination, made in capacities 250 to 1000 pounds, and available in lug hook and trolley types, is described in Bulletin 2600E. Conco Engineering Works.

☐ **23. HYDRAULIC POWER UNITS**—That is the title of bulletin issued by Hydraulic Machinery, Inc., describing its hydraulic power units, feature unit of which is the Superdraulic 5000 PSI pump powering a 12-station island unit for piercing, riveting. Units may be applied to grinding, milling, boring, drilling, pressing, broaching, etc.

☐ **24. HAND-OPERATED Screw Machine**—Bulletin 1901 issued by Monarch Machine Tool Co., describes new SpeediMatic high production hand operated screw machine. Lathe is designed to handle small machine work in quantities of 25 to 500 or more pieces. Pre-selection of speeds is electronically controlled.

☐ **25. ELECTROFLUID DRIVE** — Link-Belt Co. has developed the Electrofluid Drive—a motorized-hydraulic combination in a "packaged" unit. The new drive is said to provide all of the accepted qualities of the general purpose induction motor as well as the many meritorious features and advantages of the fluid drive. It is described in detail in Bulletin 2085.

☐ **26. GEAR TOOTH CALCULATOR**—Buyers, designers, engineers and maintenance men can make practical use of metal circulator calculator (3½" dia.) developed by Perkins Machine & Gear Company for quick determination of standard tooth proportions based on diametral pitch, 1 to 60. It indicates circular pitch, circular thickness of teeth on pitch circle, addendum (distance from pitch circle to outside diameter) and whole depth.

☐ **27. FLANGES**—"Forged Steel Flanges" is title of Volume 1 (2nd edition) of catalog just released by the Fitting Division of the Ladish Drop Forge Co. It presents complete sure ratings of flanges in the Ladish line. data covering all types, sizes and pressure ratings of flanges in the Ladish line. Authentic information enables users, buyers and designers to select exactly the type and size of flange best suited to their needs.

☐ **28. EYE HAZARDS**—Safety guide which lists 17 industrial eye hazzards in 17 industries and recommends the proper protection equipment is announced by American Optical Co. Guide is so arranged that proper choice can be made in a few seconds.

☐ **29. BLUEPRINTS, Negatives, etc.** — "Handbook of Print-Making and Processing" has been issued by Paragon-Revolute Corp. It describes equipment and is designed to save time and effort in the making of blueprints, sepia negatives, direct process prints, reproduced tracings, continuous yardage, cut sheets.

☐ **30. NYLON PAINT BRUSH**—Bulletin describes Rubberset Nylon brushes which are said to pick up and deliver more paint, to last much longer than hog bristle brushes, and to lay down a smoother, more uniform film. The bristles are finely tapered and have a "permanent wave"—crimps that provide maximum pick-up. Rubberset Co.

☐ **31. METAL CUTTING SAWS**—Capewell Handbook, pocket size, supplies practical information on the use of hand hack saw blades and metal cutting band saw blades. Speed and Feed charts aid in selection of correct tooth for the job, show feed adjustment and indicate how to determine best speed; also, tables show blades used on various machines. There is also a chapter on Friction Cutting. Capewell Manufacturing Co.

☐ **32. WELDING-CUTTING** — The Air Reduction Sales Co. announces publication of 64-page general welding and cutting products catalog. It is divided into two sections—one for oxyacetylene welding and cutting gases, equipment and supplies; the other for arc welding machines, accessories and electrodes.

☐ **33. PUMPS**—Acid and alkali resistant pumps are covered by new bulletin W-350-B1H just issued by Worthington Pump & Machinery Corp. Additional sizes increase line coverage to 200 feet and capacities to 1200 gpm. All sizes are production items in Worthite, a stainless steel resistant to wide range of corrosive conditions.

☐ **34. BRIGHT NICKEL PLATING** — New booklet details the Harshaw Modified XXX Bright Nickel Process. Sixteen well illustrated pages cover the subjects of products, formulae, economies, and Harshaw services. Features of process are simplicity of composition, simplicity of control, and simplicity of maintenance. Harshaw Chemical Co.

☐ **35. CONVEYOR BELTS**—Conveyor belts for the conveying and treatment of industrial products in the food industry, textile industry, metal industry, tanneries, ceramic, and other industries, are described and illustrated in 132-page catalog just released by the Cambridge Wire Cloth Company. Full scale illustrations show sectional belting, balanced belting, duplex belting, metal cord weave and other types.

☐ **36. MECHANICAL PACKINGS** — As a convenient guide to their "simple—yet complete" Palmetto line of mechanical packings, Greene, Tweed & Co. has released a 20-page condensed catalog, No. PC 100. It gives information on service applications as well as construction and performance features of Palmetto packings,—self-lubricating, molded, sheet and other special purpose types.

☐ **37. LOOSE-LEAF BINDERS** — Wide assortment of loose-leaf binders—piano type metal hinge, lug type metal hinges, fabric hinges, chain post binders, sectional post, solid post, Chicago screw post, etc., covers and accessories are illustrated and described in detail in 24-page catalog B issued by the C. E. Sheppard Co.

☐ **38. OIL DILUTION CALCULATOR**—Simple, new caluclator called a Dilut-O-Graph which makes it possible to compute quantities in a matter of seconds, when mixing or diluting oils may be had free of cost from the D. A. Stuart Oil Co. Given the recommended mixing proportions (1 to 5 and so on) and the capacity of the tank, it shows precisely how much base oil to use. Graph is 4½" in diameter, and is made of special composition board.

☐ **39. ONION SKIN Papers**—Sample book contains 17 letter size sheets of Gibraltar Onion Skin thin papers in white and six colors, cockle, glazed and dull finishes, and laid watermark in white. It is available from Millers Falls Paper Co.

☐ **40. BUSHINGS-BEARINGS** — Formetal bushings and bearings and spacer tubes are described in new catalog just issued by National Formetal Co., Inc. Wide range of units in bronze, brass and steel are illustrated in full color, with detail descriptions and measurements. Catalog contains technical data and ordering information.

☐ **41. PRECISION CASTING** — Two booklets on this interesting subject are available from the Industrial Division of the Kerr Dental Manufacturing Co. One is entitled "Fundamentals of Industrial Precision Casting", and the other lists the equipment

(*Continued on page* 19)

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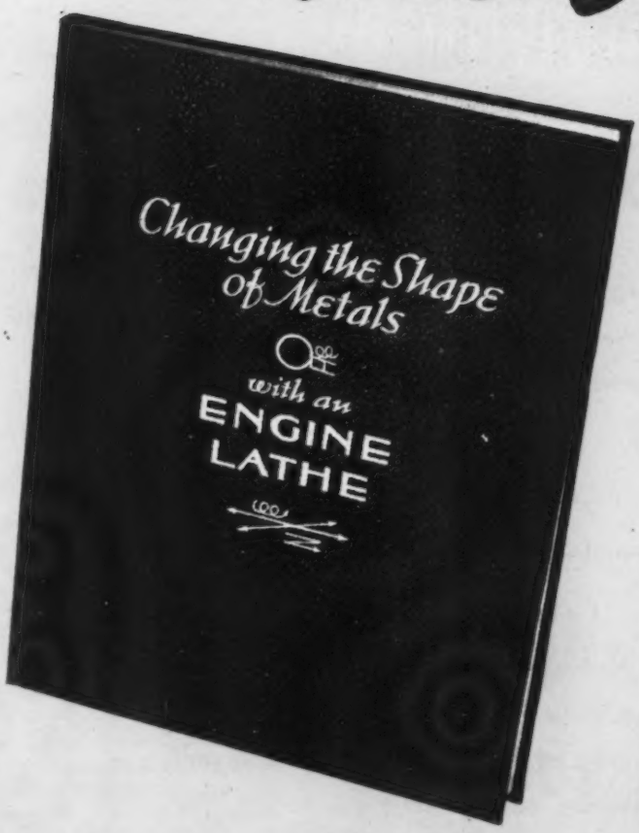

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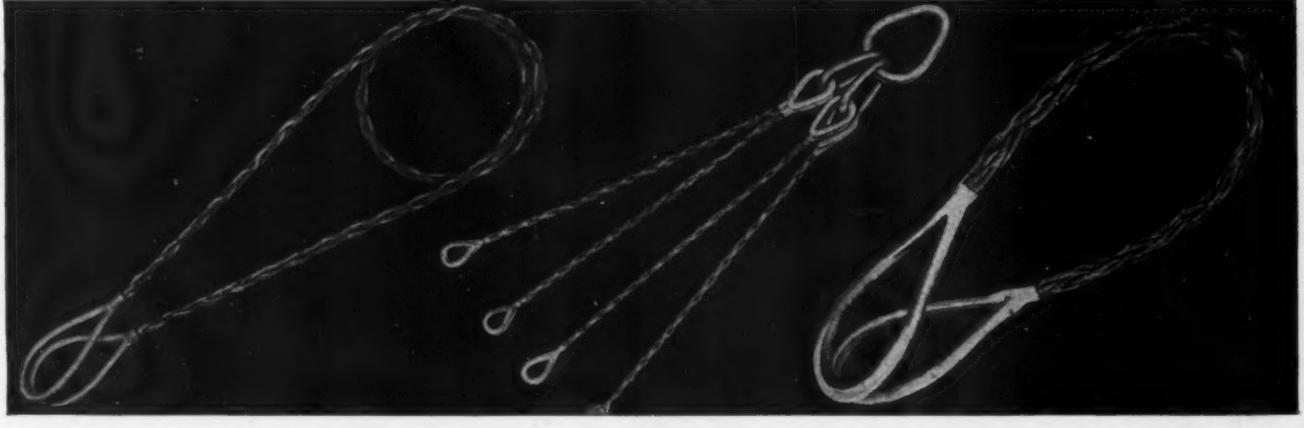

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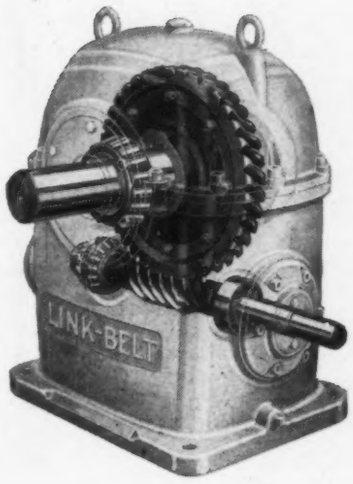

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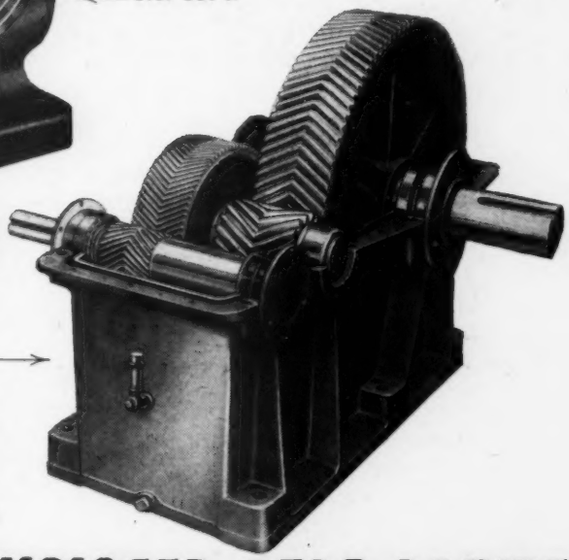

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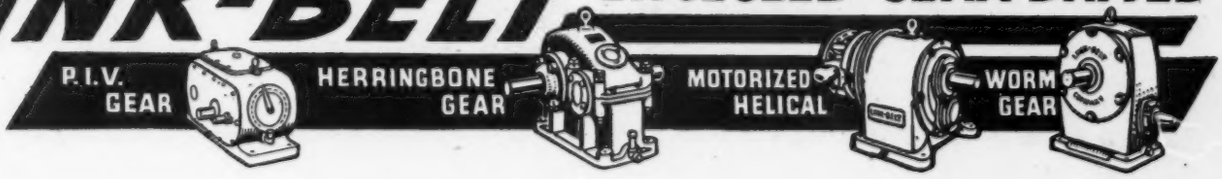

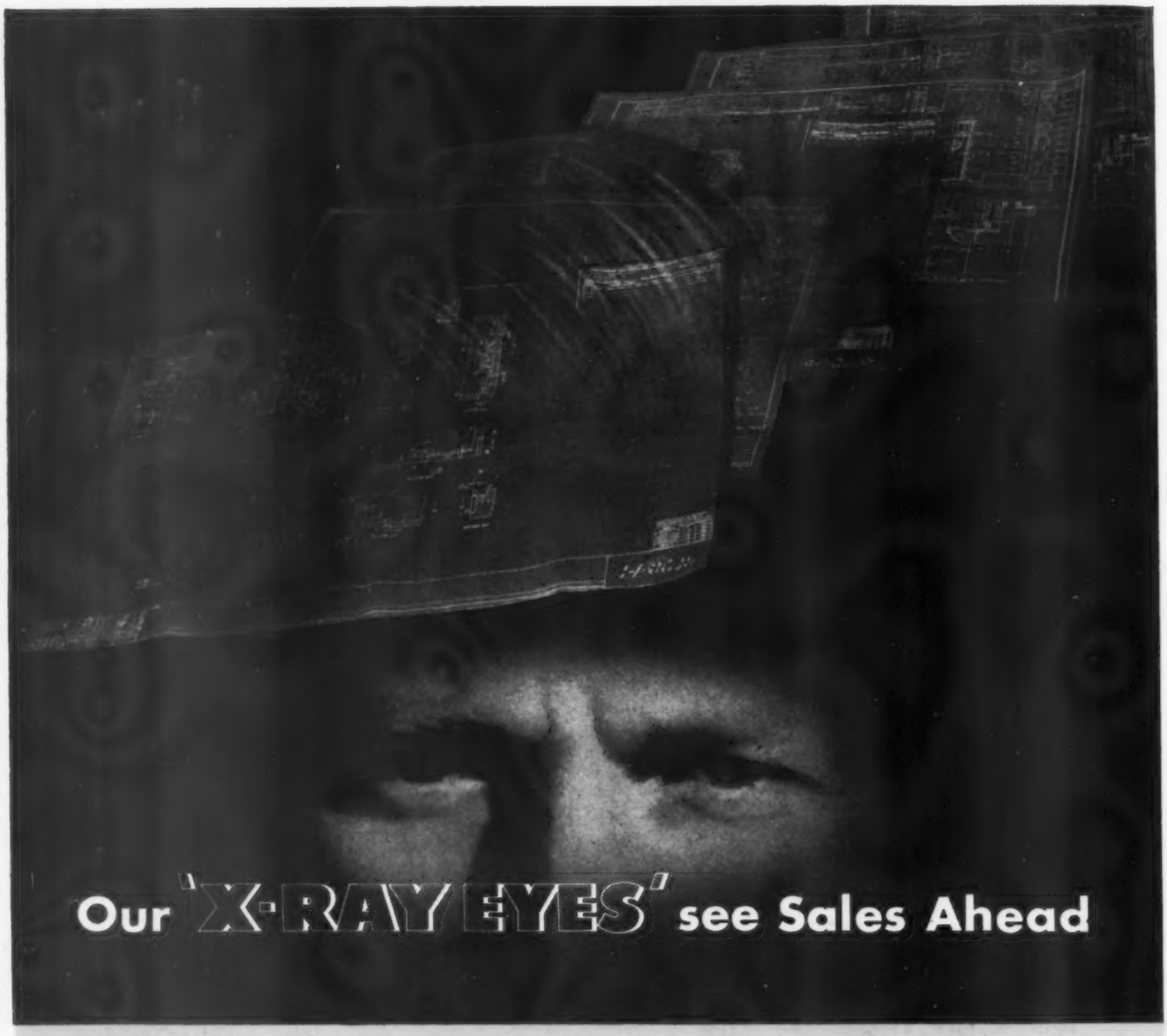

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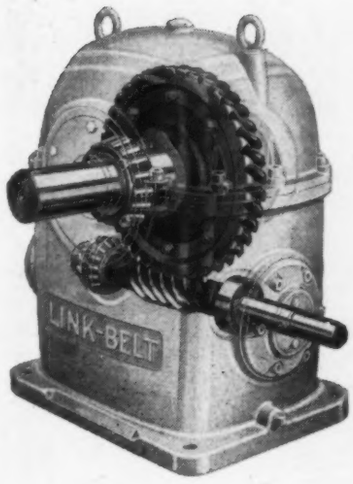

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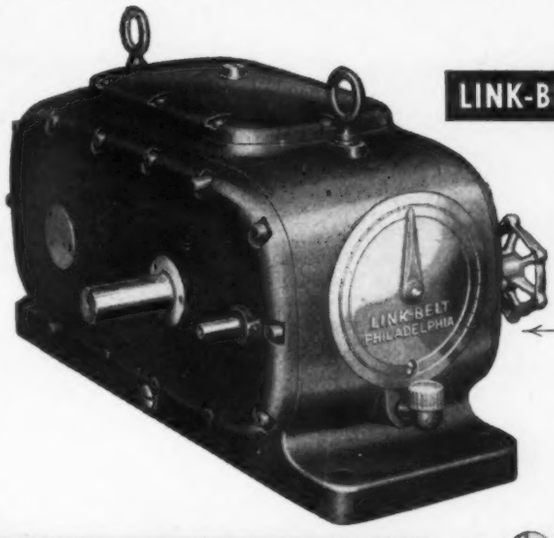

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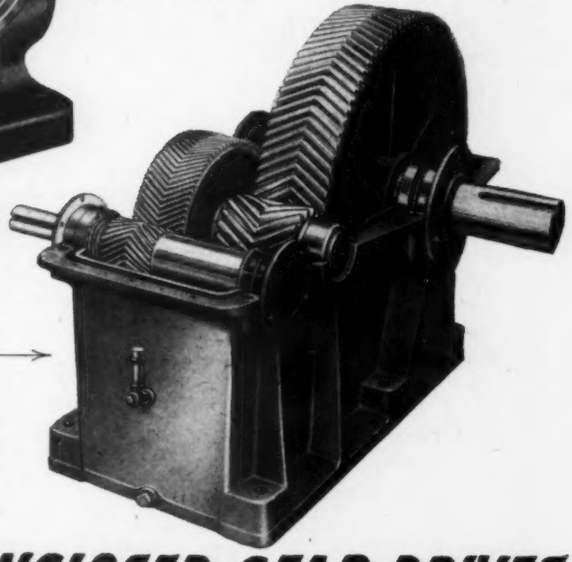

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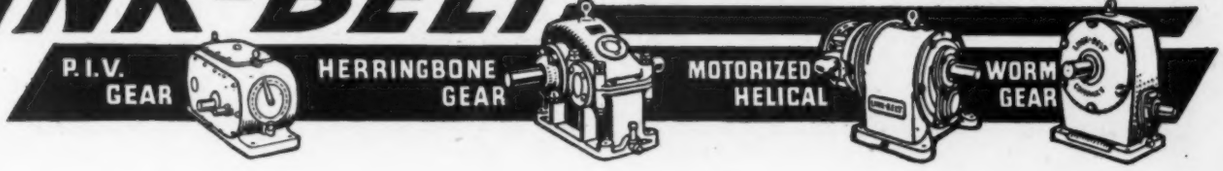

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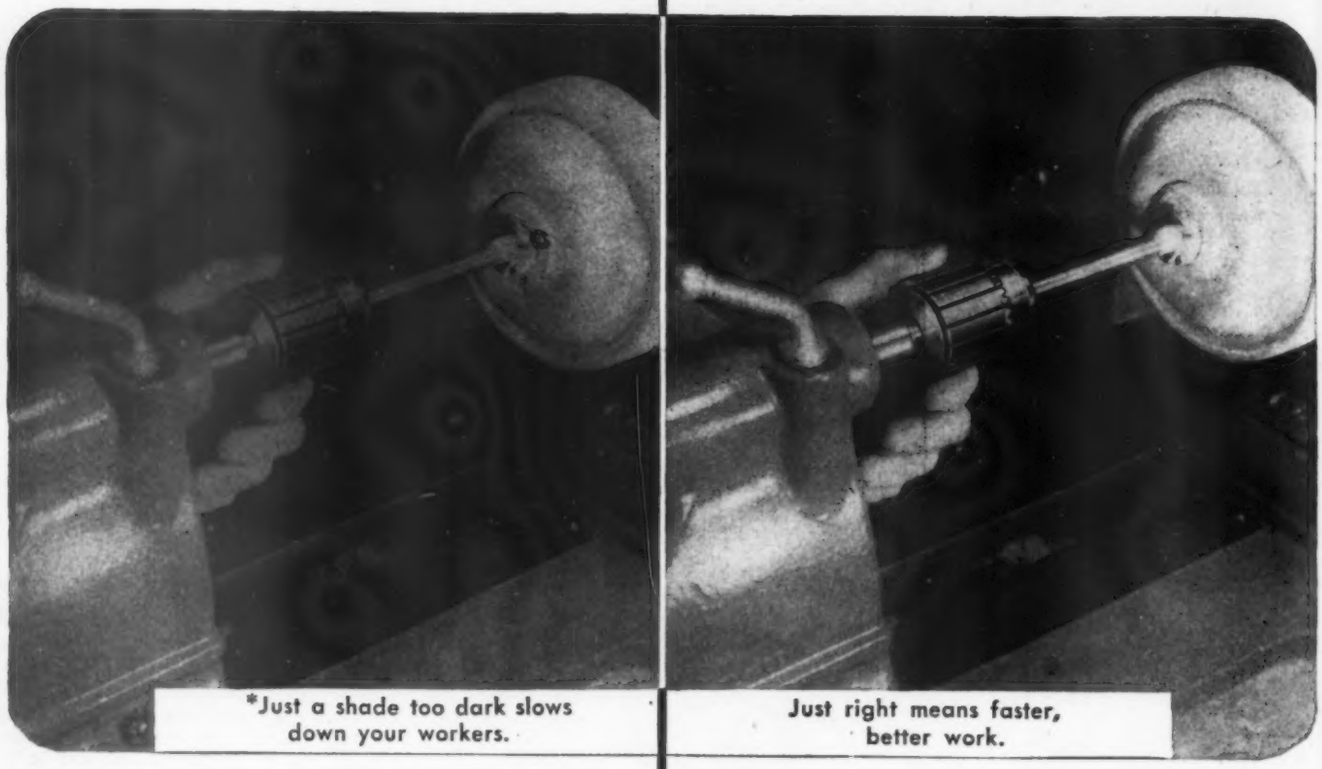

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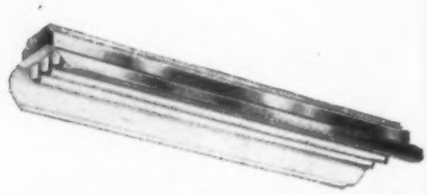

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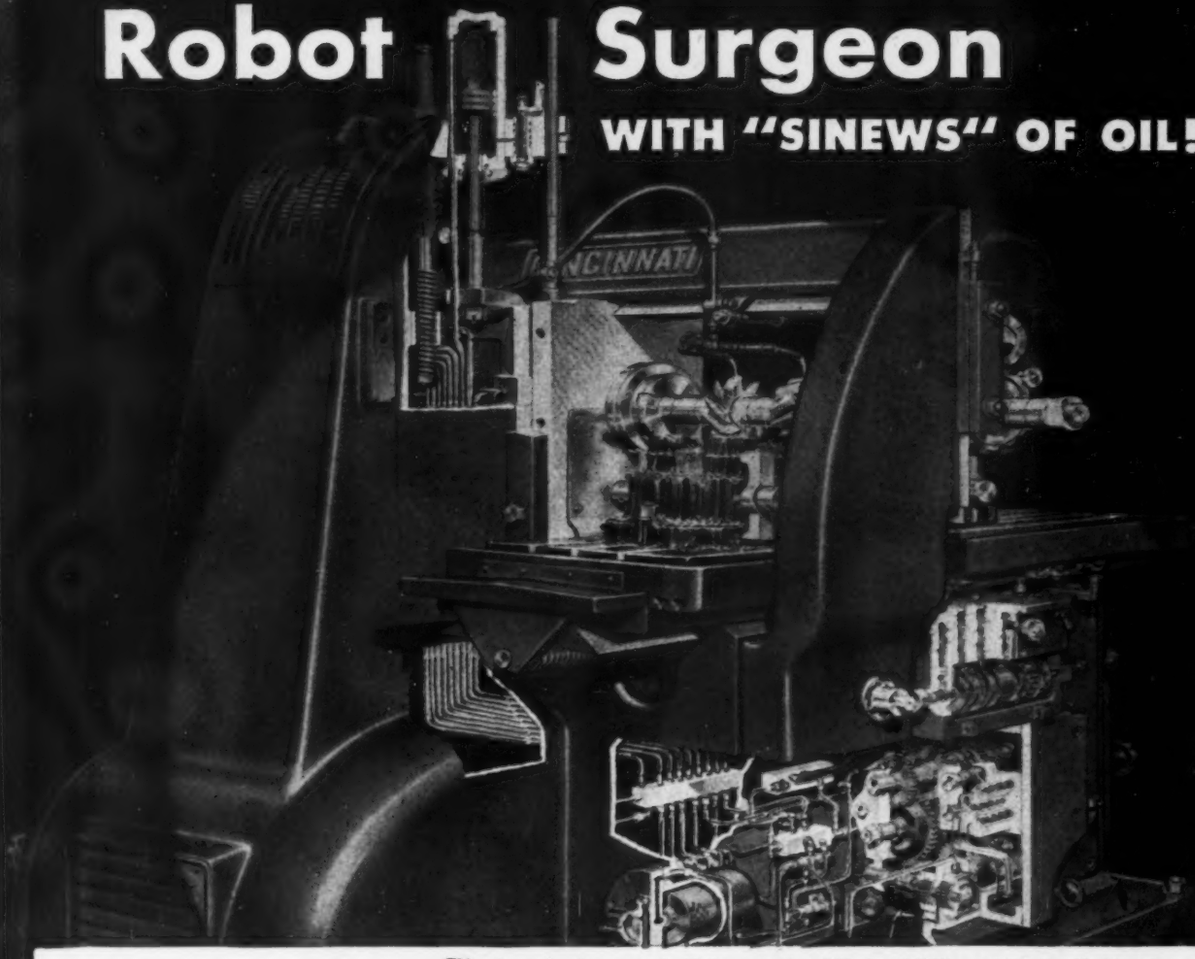
Robot Surgeon

WITH "SINEWS" OF OIL!



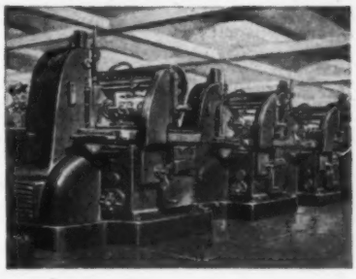
This cutaway drawing prepared with the cooperation of Cincinnati Milling and Grinding Machines, Inc.

A Socony-Vacuum Inside Story

You're looking at a major operation on a piece of metal. The surgeon is a modern milling machine. It uses revolving cutters to shape metal into parts for cars, planes, machinery.

This automatic robot performs as many as 24 different functions. It works with amazing smoothness, cuts to split hair's-breadth accuracies.

It's all done with hydraulic controls. "Sinews" of oil transmit



the power that governs the precise, smooth movements of the machine. The same oil also bathes the tableways, the bearings and the gears with rich wear-resisting lubricating films.

A special combination hydraulic fluid and lubricating oil, developed by Socony-Vacuum, does this double job—assures continued sensitive control, protection against wear.

Matching machine progress with the right oil—that's Socony-Vacuum's Correct Lubrication Program. Get it for your plant!

SOCONY-VACUUM OIL CO., INC.
and Affiliates: Magnolia Petroleum Co., General Petroleum Corporation

TUNE IN THE MOBILGAS PROGRAM — MONDAY EVENINGS, 9:30 E.S.T.—NBC

GARGOYLE Lubricants — SOCONY-VACUUM

The inside track to profits...
SOCONY-VACUUM CORRECT LUBRICATION

THE "MANGANESE STEEL CURTAIN"

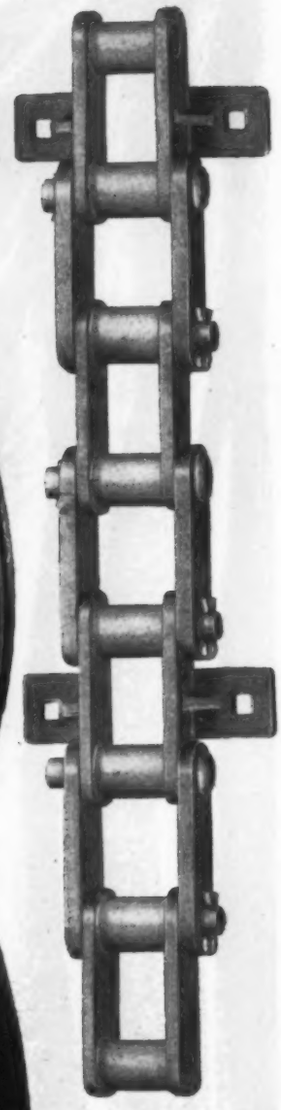
AMSCO
CAST PARTS that protect industry AGAINST WEAR

Dipper Lip

Cone Crusher Mantle

Clinker Kiln Spur Pinion

Larry Car Wheel



Combination Chain with Attachments

Dredge Cutter Head

STOP COSTLY REPLACEMENTS AND REPAIRS

Install Amsco Manganese Steel Cast Parts — they keep serving where ordinary metals rapidly wear away . . . they stand up under service abuse that fractures other metals. Designed to last and made of "The Toughest Steel Known," Amsco parts are a must for industrial equipment handling the tough jobs.

Continued impact only serves to harden the surface of austenitic manganese steel up to 550 Brinell — develops a smooth "plow-share" finish that resists abrasion . . . yet the body metal always retains its basic toughness.

Amsco specializes in cast manganese steel parts that have to take it . . . in dredging, crushing, pulverizing, excavating, road-building, mining and quarrying . . . for almost any use that requires real service under the most adverse operating conditions. Write for bulletins and information today.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.

Liquid Insulation

FAULTLESSLY RIGHT

and Ready to use....

To prevent costly evaporation of petroleum products, to aid in preserving the quality of refrigerated goods, to reduce temperatures in trucks and buses, in railroad cars and buildings – as well as to prevent rust and corrosion . . . American industries use Permite Ready-Mixed Aluminum Paints: **liquid insulation.**

Aluminum painted surfaces of tanks or other structures reflect the sun – reduce interior heat many degrees. Thus liquid losses are minimized, cold temperatures maintained. Air conditioning systems function with less effort, at lower cost.

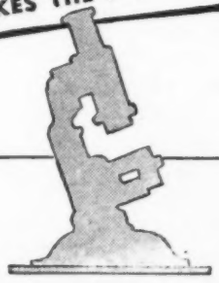
The quality of heat and light reflectivity in Permite Paints – as well as their rust preventive properties – is due to the meticulous balancing of pigment (99%+ pure aluminum) and an exclusive vehicle of synthetic resins and specially adapted oils. These stabilized ingredients cause a protective film of overlapping metallic flakes to build up flat and smooth, to form a reflective finish that's impenetrably hard and silvery bright.

Durable Permite Aluminum Paints, faultlessly right and ready to use on opening the can, are **liquid insulation** against product losses from evaporation and property deterioration from rust and corrosion. A nearby Distributor can supply them on short notice.

THE SKILLS

of aluminum paint specialists are devoted entirely to making Permite Aluminum Paints --- in America's only plant designed to make aluminum paints exclusively.

THE VEHICLE MAKES THE DIFFERENCE!

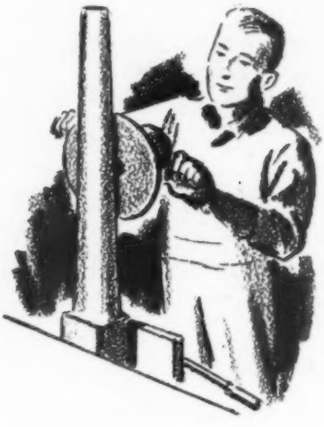


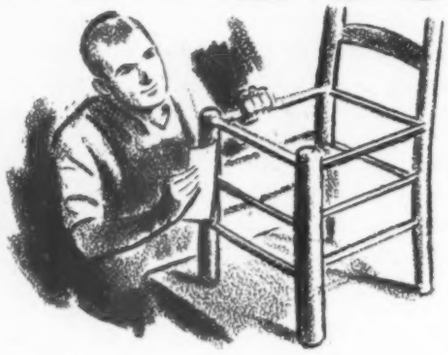
ALUMINUM INDUSTRIES, Inc.
Cincinnati 25, Ohio

PERMITE READY MIXED ALUMINUM PAINTS

"Sandpaper" For Legs

ONE GRADE of Jewel sandpaper is so fine that it has found widespread use for depilatory mittens. Less glamorous legs require different smoothing techniques.





For woodworking, special Jewel Garnet, prepared by an exclusive process, is rapidly replacing more expensive artificial abrasives.

In the metal-working field, Weldisks with their safety backing and Bondex adhesive offer fast, clean cutting, with accident protection and long wearing qualities as definite Jewel "plus" values.

For grinding and polishing metals, Silver Streak abrasive belts provide a heat-resistant grinding medium, free from metal "scorch" and adhesive melting, with its grit-clogging and consequent short life.

Remember Jewel Abrasives next time you order from your jobber. There's a Jewel product for *every* grinding and polishing job.

ABRASIVE PRODUCTS, INC. JEWEL ABRASIVES SOUTH BRAINTREE, MASS. U.S.A.

Abrasive Products, Inc.

SOUTH BRAINTREE 85, MASSACHUSETTS • MAKERS OF JEWEL COATED ABRASIVES

"ROUGHING IT" THE EASY WAY

Another problem solved by BWH!

Applying a new facing to a big western dam posed a problem for the contractor. The old face had to be "roughed" with compressed air into an irregular pattern to hold the new concrete. That meant finding an air hose that could "take" high pressures, heat and oil from the compressors, shocks from sharp falling rocks and contact with rocky surfaces. To handle this job, BWH recommended tough Bay State Air Drill Hose.

The tube of this rugged hose is made with the highest-quality, extra-heavy rubber . . . able to withstand the deteriorating action of hot oils. Several plies of strong duck, bonded together with long-life friction, form the carcass. Since the contractor selected 2½" hose, the duck had to be 40% heavier than for smaller sizes.

Tube and carcass were encased in a stout rubber cover . . . the strongest ever devised to resist surface damage. This powerfully built hose performed perfectly . . . helped the contractor finish the job without costly delays.

Bay State Air Drill Hose is just one of the many quality products manufactured by BWH. Whatever industrial rubber goods you need, look to BWH for dependable ruggedness . . . BWH distributors for dependable service.

HAVE YOU A JOB WHERE STAMINA COUNTS? Bring us your toughest problems . . . we're specialists in solving them. Consult your nearest BWH distributor, or write direct.

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in All Principal Cities

WORKS: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

Protects your product against concealed shipping damage

Whether the packaging of your product calls for Surface Protection, Absorbent Packaging, Flotation Packaging, or Bracing and Blocking, there's a specification of low-cost KIMPAK* to do the job perfectly. For cushiony KIMPAK has every quality required in all four of the Basic Methods of Interior Packaging.

KIMPAK is soft, grit-free, and chemically neutral. Can be supplied in liquid absorbent or liquid repellent specification. Provides more cushion than many materials of far greater weight and density. And it's as quick and easy to use as wrapping paper!

Discover how KIMPAK can increase protection in your packaging. Phone your local distributor today, or write Kimberly-Clark Corporation, Creped Wadding Division, Neenah, Wisconsin.

We are producing all the KIMPAK Creped Wadding we possibly can, but due to the great demand, your distributor may have some difficulty in supplying you immediately.

A PRODUCT OF Kimberly Clark RESEARCH

Kimpak

REG. U.S. PAT. OFF. & FOREIGN COUNTRIES

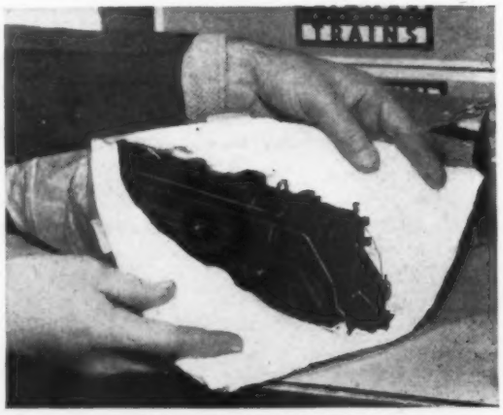
CREPED WADDING

*KIMPAK (trademark) means Kimberly-Clark Creped Wadding.

SURFACE PROTECTION
Photo courtesy Edison G. E. Appliance Co.

ABSORBENT PACKAGING
Photo courtesy Smith, Kline & French

FLOTATION PACKAGING
Photo courtesy Marconi Radio & Television Co.



BLOCKING AND BRACING
Photo courtesy Lionel Mfg. Co.

All 9 fingers in the control box (right) are Riverside Phosphor Bronze.

RIVERSIDE PHOSPHOR BRONZE IN ACTION

Gnawing out a seam of coal in close quarters is a man's size job for tough equipment.

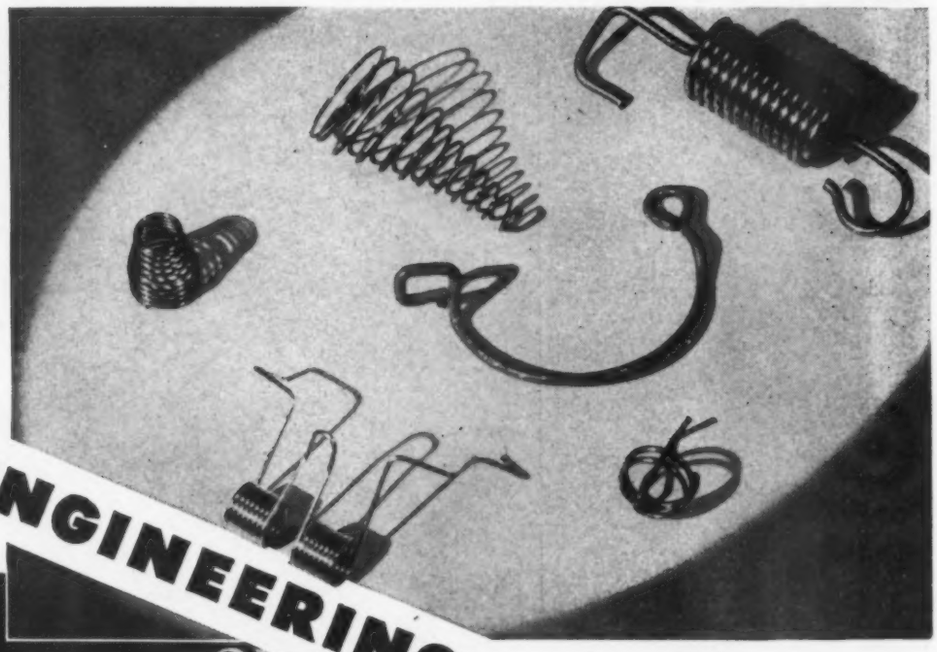
The power for operating the Goodman shortwall coal cutting machine flows through contact fingers made of Riverside *Phosphor Bronze*. These fingers resist corrosion and bear up under repeated flexure. The unusual fatigue strength of Riverside *Phosphor Bronze* and resistance to atmospheric conditions make it especially valuable and economical for critical current carrying springs. Riverside *Phosphor Bronze* is one of three families of alloys in which we specialize. Interesting booklets about Riverside *Phosphor Bronze*, *Nickel Silver* or *Beryllium Copper* are yours for the asking.

INSIDE RIVERSIDE

The foundation of our business is service; courteous, helpful, convenient service. This is one reason why we have sales offices strategically located in New York, Chicago, Cleveland and Hartford. Please ask us for help whenever the need arises.

RIVERSIDE

THE
RIVERSIDE METAL COMPANY
NEW YORK CHICAGO RIVERSIDE • NEW JERSEY HARTFORD CLEVELAND



Where ENGINEERING meets EXPERIENCE halfway

The effects of dynamic and eccentric loading of springs; rubbing contact; buckling; small but unavoidable variations in wire and spring diameters—these and many other factors are often sufficient to upset all theoretical calculations in spring design. Satisfactory performance and long life, therefore, depend to a large extent on a rare combination of spring engineering and long practical experience in diagnosing and prescribing the remedy for fatigue failures and other spring troubles.

Successful spring designing consists of producing the simplest and least expensive springs which will do the work satisfactorily. That's why the highly specialized engineering and practical experience of the "Cleveland" organization is of definite value to manufacturers when designing new equipment or instruments. This service is yours for the asking, without cost or obligation.

Cleveland SPRINGS

CLEVELAND WIRE SPRING CO.

2012 West 25th Street, Cleveland 13, Ohio

Subsidiary of Reynolds Spring Company, Jackson, Mich.

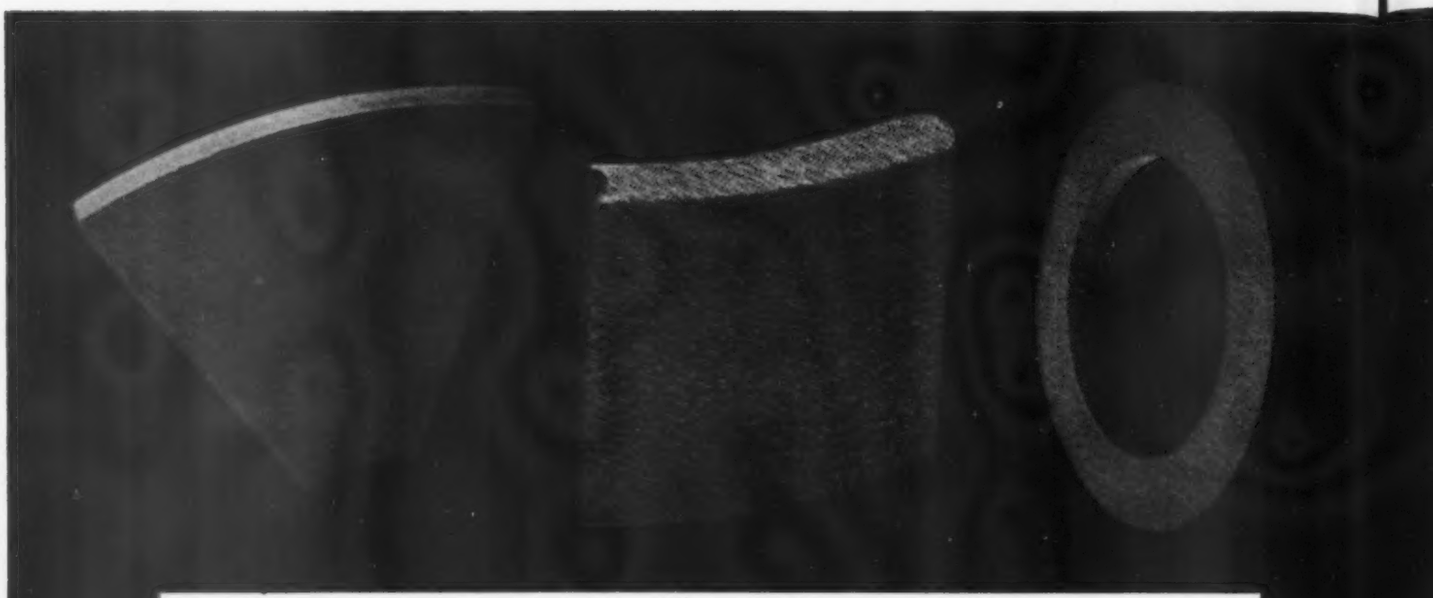
Two ways to keep ahead when you buy Fluorescent Lamps

1 **ONE WAY** would be to put a group of lamp research scientists to work looking for new phosphors. It's the phosphor—a powder coating on the inside of the tube — which transforms invisible ultra-violet energy into visible light. You'd get a thrill when you found new phosphors or new combinations of phosphors, like the one recently developed by General Electric lamp scientists to give white light so natural in color that you'd think you were outdoors on a sunny morning in June. But you don't need to try to duplicate all General Electric's lamp research and testing facilities. To get the full benefit of the world's foremost lamp research, all you need to do is . . .

2 **INSIST ON THE GE MONOGRAM** on all the fluorescent lamps you buy for your business or home. It's a reliable guide to lamp value, because no effort has been spared at General Electric to give you more and more light for your money. *And you can be sure that G-E Lamp research, which has produced nearly all major fluorescent developments, works constantly toward one objective—to make G-E Lamps Stay Brighter Longer.

G-E LAMPS

GENERAL ELECTRIC



Beautiful music to a cost man's ears

Maybe you are unaware of profit leaks creeping into your plant through low production rates and excessive wheel replacements.

A new note of gladness will strike a responsive chord with your cost man when he sees the savings after a shift to job-designed Peninsular grinding wheels.

Peninsular engineers have specialized in such savings since 1889 and are available for a careful study of your grinding operations. They can show the way to substantial cost reductions through a change-over to wheels specially designed for your work. They make a complete analysis of your equipment, of the material to be ground, and of all other important factors that influence costs.

Their findings are used to develop a special formula and the proper shape for grinding wheels that are most efficient for your work. *Every* Peninsular grinding wheel is specially made for its particular job.

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Newark, Pittsburgh, Houston, St. Louis, Cincinnati.

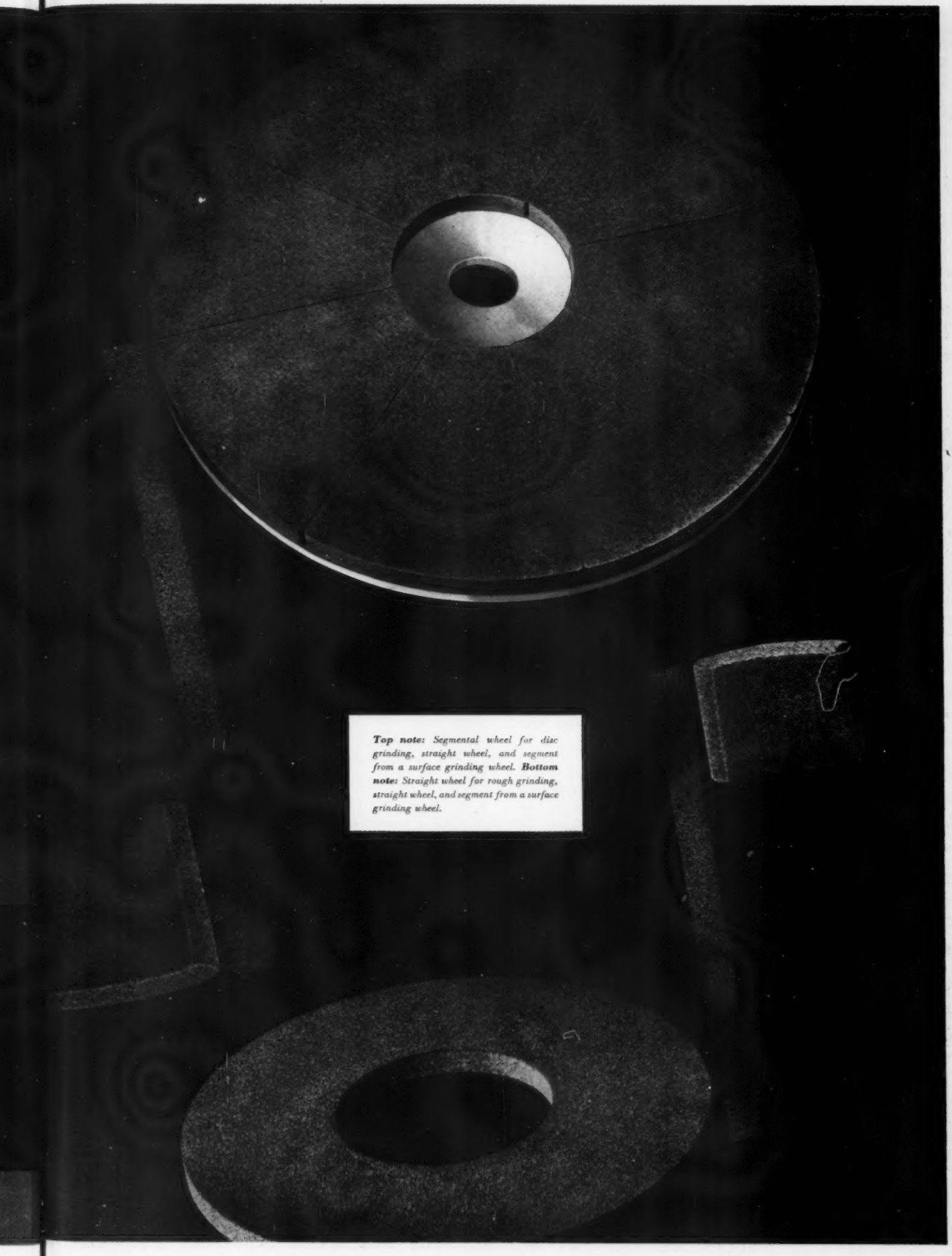
PENINSULAR

INDIVIDUALLY PENINSULAR ENGINEERED

GRINDING WHEELS

SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS

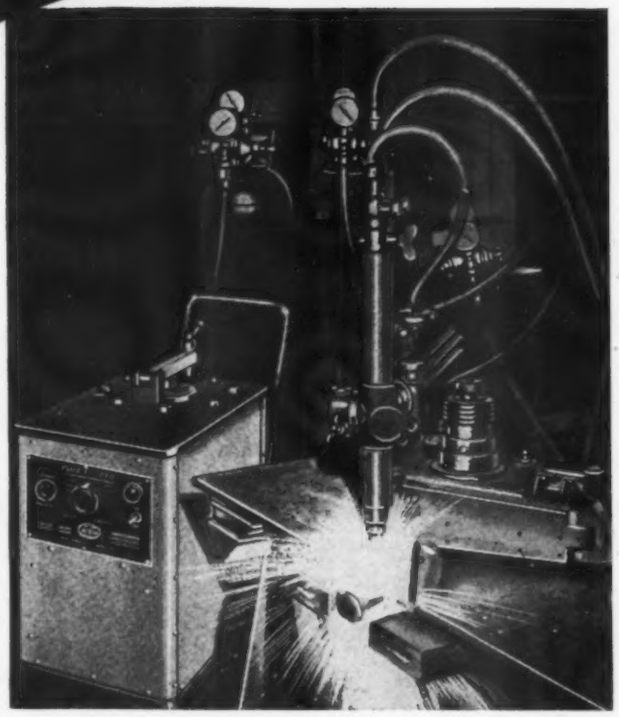


Top note: *Segmental wheel for disc grinding, straight wheel, and segment from a surface grinding wheel.* ***Bottom note:*** *Straight wheel for rough grinding, straight wheel, and segment from a surface grinding wheel.*

Still looking into the Future

YESTERDAY... Punch, snip or melt ... a grueling grind for the cutting of Stainless Steels

Yesterday cutting stainless steel by melting-away or shearing was slow...costly...and with the carbon arc the resulting surfaces were rough and unsightly.



TODAY... It's the oxyacetylene flame for production cutting of Stainless Steels

Today, Airco's new Flux-Injection Method of stainless steel cutting is time-saving and economical. With this new process, stainless steels with alloying elements as high as 50% can be oxyacetylene flame cut as readily as ordinary steels. Used with Airco oxyacetylene equipment, this new method keynotes simplicity and economy. In fact, operating conditions and instructions for stainless steel cutting approximate those for mild steel, and "cut speed" is comparable.

AND TOMORROW...?

Airco's research and development staff will continue to work in this and other fields of metal working to contribute new and better oxyacetylene flame methods... creating the techniques and tools of tomorrow. Moreover, the facilities of our Technical Sales Division are available to all metal working men in applying Airco processes to the solution of their problems.

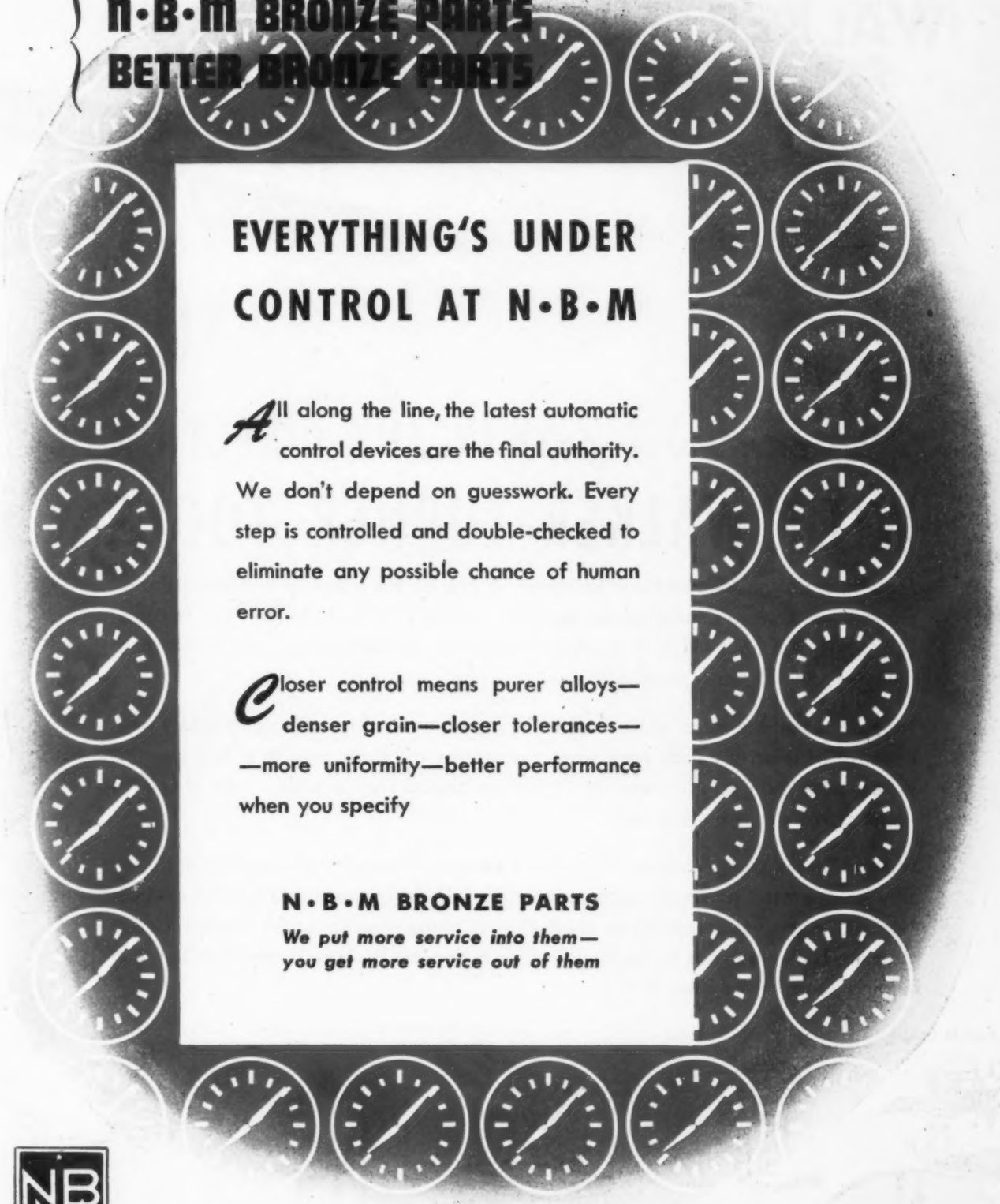
For more information about stainless steel cutting, write for a copy of "Flux-Injection Method Brings Economies of Oxyacetylene Flame Cutting to Stainless Steel". Address your nearest Airco office, or write: Air Reduction, General Offices, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, General Offices, Houston 1, Texas.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

ORIGINATORS OF MODERN OXYACETYLENE METHODS FOR THE METAL WORKING INDUSTRY

N·B·M BRONZE PARTS
BETTER BRONZE PARTS



EVERYTHING'S UNDER CONTROL AT N·B·M

All along the line, the latest automatic control devices are the final authority. We don't depend on guesswork. Every step is controlled and double-checked to eliminate any possible chance of human error.

Closer control means purer alloys—denser grain—closer tolerances——more uniformity—better performance when you specify

N·B·M BRONZE PARTS
We put more service into them—you get more service out of them

NBM
AMERICAN Brake Shoe COMPANY
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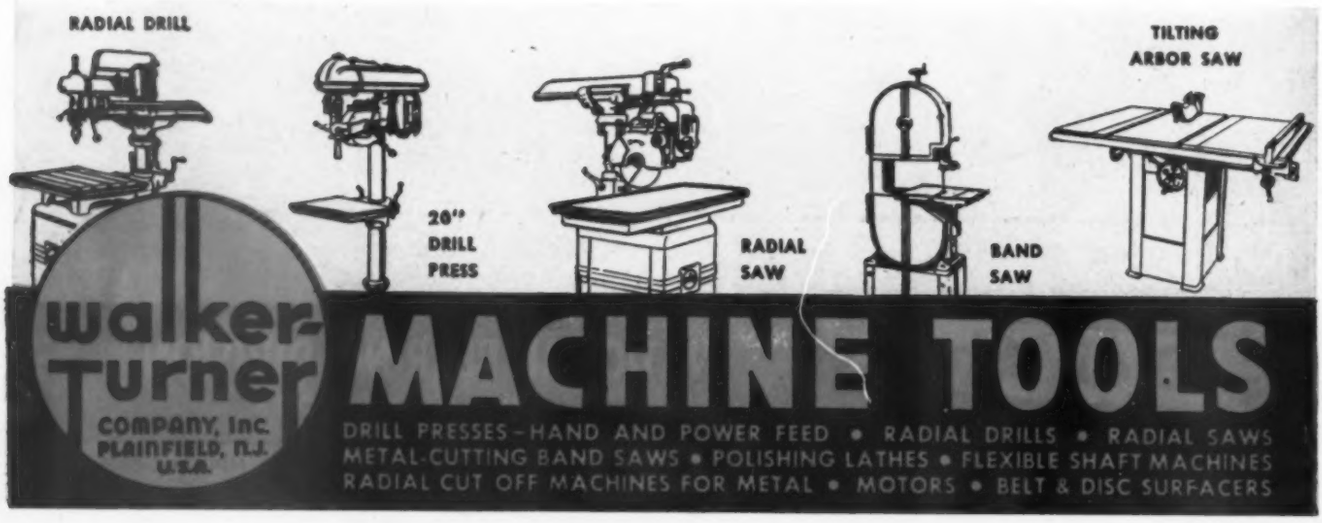
You can move fast IN ANY DIRECTION WITH WALKER-TURNER TOOLS

Materials, design, markets and competition are on the move. It will require alert management and a flexible plant layout to survive with profit in the days to come. Walker-Turner Light Machine Tools provide both immediate and permanent flexibility—financially and physically.

They represent the latest achievements in speed, ease of handling and safety and, because of their low cost, they write themselves off the books in a few months. When quick changes are necessary, you may choose from a wide range of speeds —and a variety of cutting tools.

Walker-Turner Light Machine Tools have extreme flexibility of application. They may be operated as bench models, floor models—in groups or as special set-ups. Plan your operations to speed up production in many directions with Walker-Turner Machine Tools—and use the guidance of your nearest Walker-Turner distributor in helping you with the know-how.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RADIAL CUT OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS

Salvage and repair cast iron parts

Quickly Easily with

Repair crews say Ni-Rod* is the smoothest-handling electrode they've ever used for welding cast iron.

With it, they get strong welds . . . sound welds . . . machinable welds.

. . . and they have an easy time getting them!

Ni-Rod has such excellent flow characteristics that slight variations in manipulation of the electrode have little effect on weld quality. Smooth, even deposits are readily applied in all positions — down-hand, vertical or overhead. No "special treatment" is needed; preheating is seldom required.

Broken or worn castings — even those in awkward, hard-to-get-at spots — are frequently repaired without dismantling equipment, thus saving time and labor.

You'll find plenty of jobs for Ni-Rod. This all-purpose electrode works equally well on either A.C. or D.C. It's available in diameters of 3/32", 1/8", 5/32" and 3/16" from the distributors listed below.

Order a 5-pound package of Ni-Rod for use on all cast iron welding work where strong, sound, machinable welds are essential.

*Reg. U. S. Pat. Off.

Send for Free Instruction Booklet

THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET, NEW YORK 5, N. Y.

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NI-ROD IS DISTRIBUTED BY:

WHITEHEAD METAL PRODUCTS COMPANY, INC., Baltimore, Boston, Buffalo, Newark, New York, Philadelphia, Syracuse

WILLIAMS AND COMPANY, INC., Cincinnati, Cleveland, Columbus, Pittsburgh, Toledo

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J. M. TULL METAL & SUPPLY CO., Atlanta

EAGLE METALS CO., Portland, Seattle

METAL GOODS CORPORATION, Dallas, Houston, New Orleans, Tulsa

HENDRIE & BOLTHOFF M & S CO., Denver

ROBERT W. BARTRAM, Montreal

ALLOY METAL SALES, LTD., Toronto

WILKINSON COMPANY, LTD., Vancouver

METAL & THERMIT CORPORATION*

HOLLUP CORPORATION*

NATIONAL CYLINDER GAS COMPANY*

*Offices in principal cities

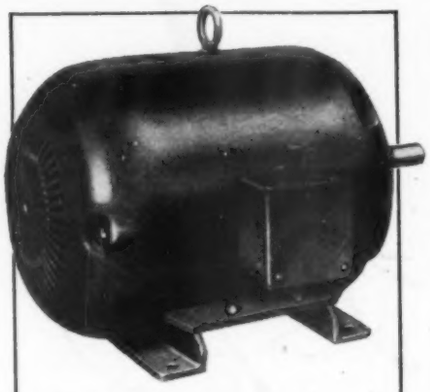
DUST and DIRT CAN'T HURT WAGNER ℓp MOTORS*

**Totally-Enclosed Fan-Cooled Motors are SEALED against Harm . . .*

THEY'RE built to take it . . . They're protected against dust, dirt, grit, steel chips, abrasives, and other destructive elements that would tear the heart out of ordinary motors. That's why you find thousands of Wagner totally-enclosed fan-cooled motors giving dependable service day after day, year after year, doing the dirty jobs in industry without asking favors.

If you use motors, it will pay you to investigate Wagner—A complete line . . . built by engineers who know how to build quality motors that will help you maintain peak production. Users of Wagner motors also profit by our quick, convenient, nationwide service facilities.

Contact any of our twenty-nine branch offices, located in principal cities and manned by trained field engineers ready to give you advice on all of your motor problems. Bulletins on the complete line of quality motors will be sent upon request. Address Wagner Electric Corporation, 6360 Plymouth Avenue, St. Louis 14, Mo.

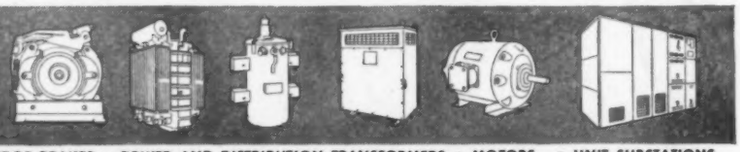


Pictured above is a Wagner totally-enclosed fan-cooled motor. Wagner makes a complete range of motors for every application.

M47-8

Wagner Electric Corporation EST. WE 1891

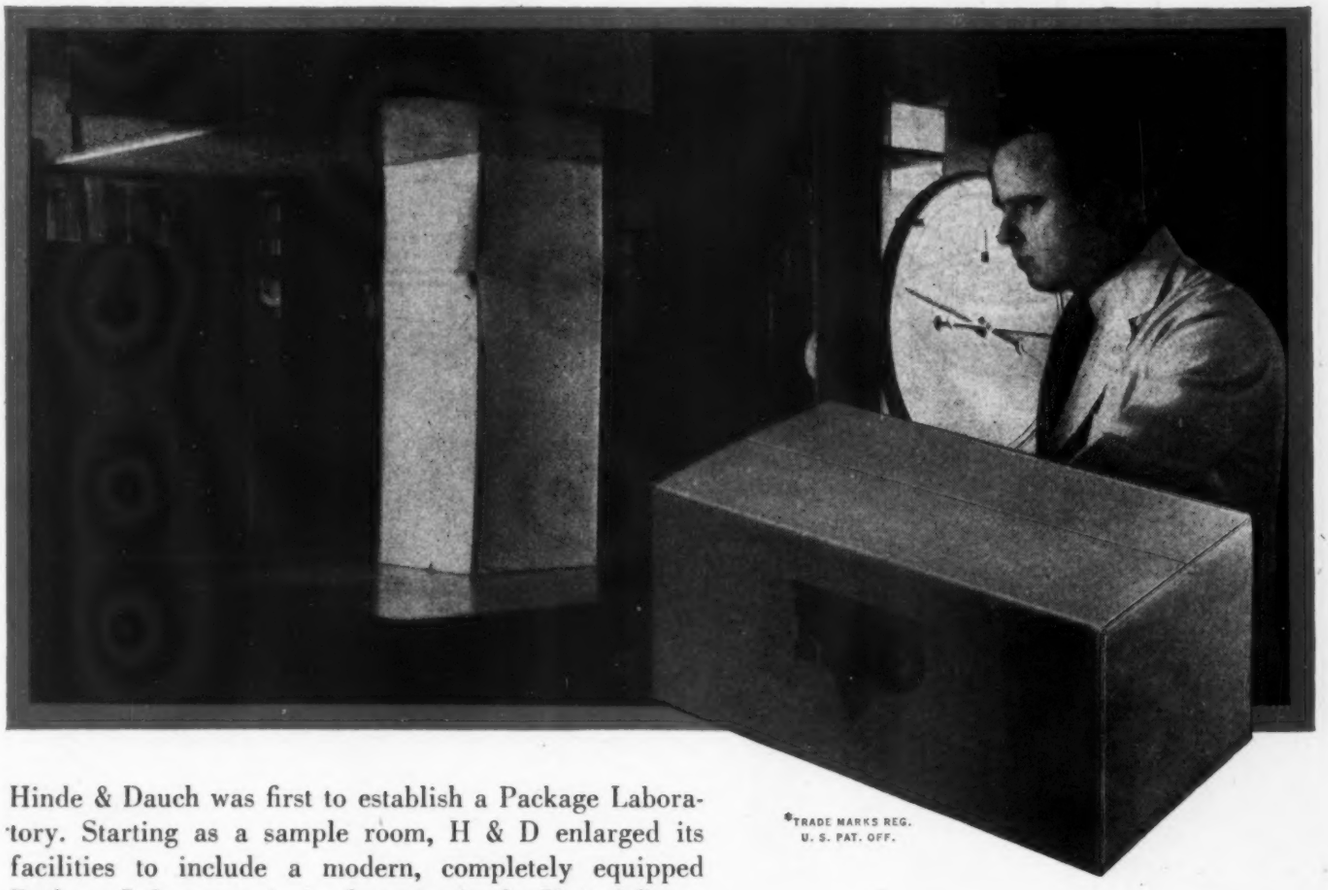
Consult Wagner Engineers on all Electric Motor Problems



BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

ELECTRICAL AND AUTOMOTIVE PRODUCTS

first to establish a PACKAGE LABORATORY



Hinde & Dauch was first to establish a Package Laboratory. Starting as a sample room, H & D enlarged its facilities to include a modern, completely equipped Package Laboratory in its factories in the United States and Canada. From the Package Laboratory came the LIFE PRESERVER*, the first baby chick shipping box; the first corrugated box for shipping canned foods; PRE-PAK*, the first unit package. These and many other H & D "firsts" were developed in the Package Laboratory where scientific construction and design are employed to increase packaging efficiency and reduce packaging costs. The Hinde & Dauch Paper Company, 4701 Decatur Street, Sandusky, Ohio.

*TRADE MARKS REG. U. S. PAT. OFF.

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H&D

FOR PACKAGING "firsts"

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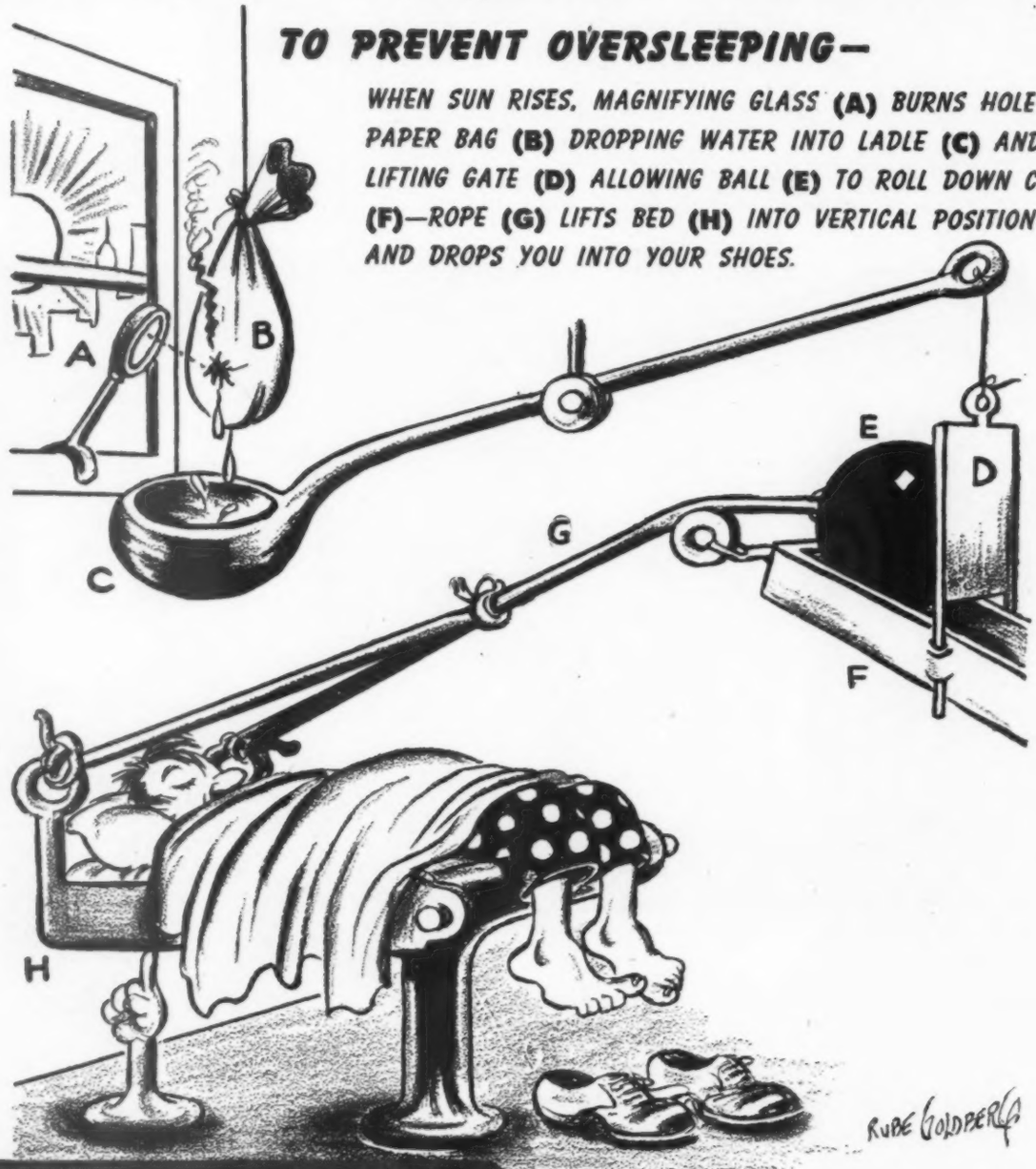
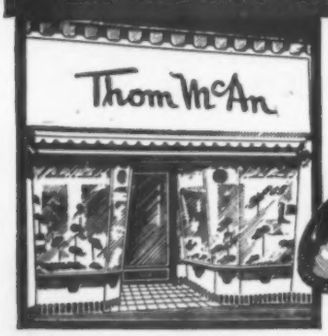
One Way To Do It! — by RUBE GOLDBERG

TO PREVENT OVERSLEEPING—

WHEN SUN RISES, MAGNIFYING GLASS **(A)** BURNS HOLE IN PAPER BAG **(B)** DROPPING WATER INTO LADLE **(C)** AND LIFTING GATE **(D)** ALLOWING BALL **(E)** TO ROLL DOWN CHUTE **(F)**—ROPE **(G)** LIFTS BED **(H)** INTO VERTICAL POSITION AND DROPS YOU INTO YOUR SHOES.



MAKE THIS STORE YOUR SAFETY SHOE DEPT.



More than 500 stores in over 300 cities

SAFETY SHOE DIVISION
25 W. 43 ST., NEW YORK 18, N. Y

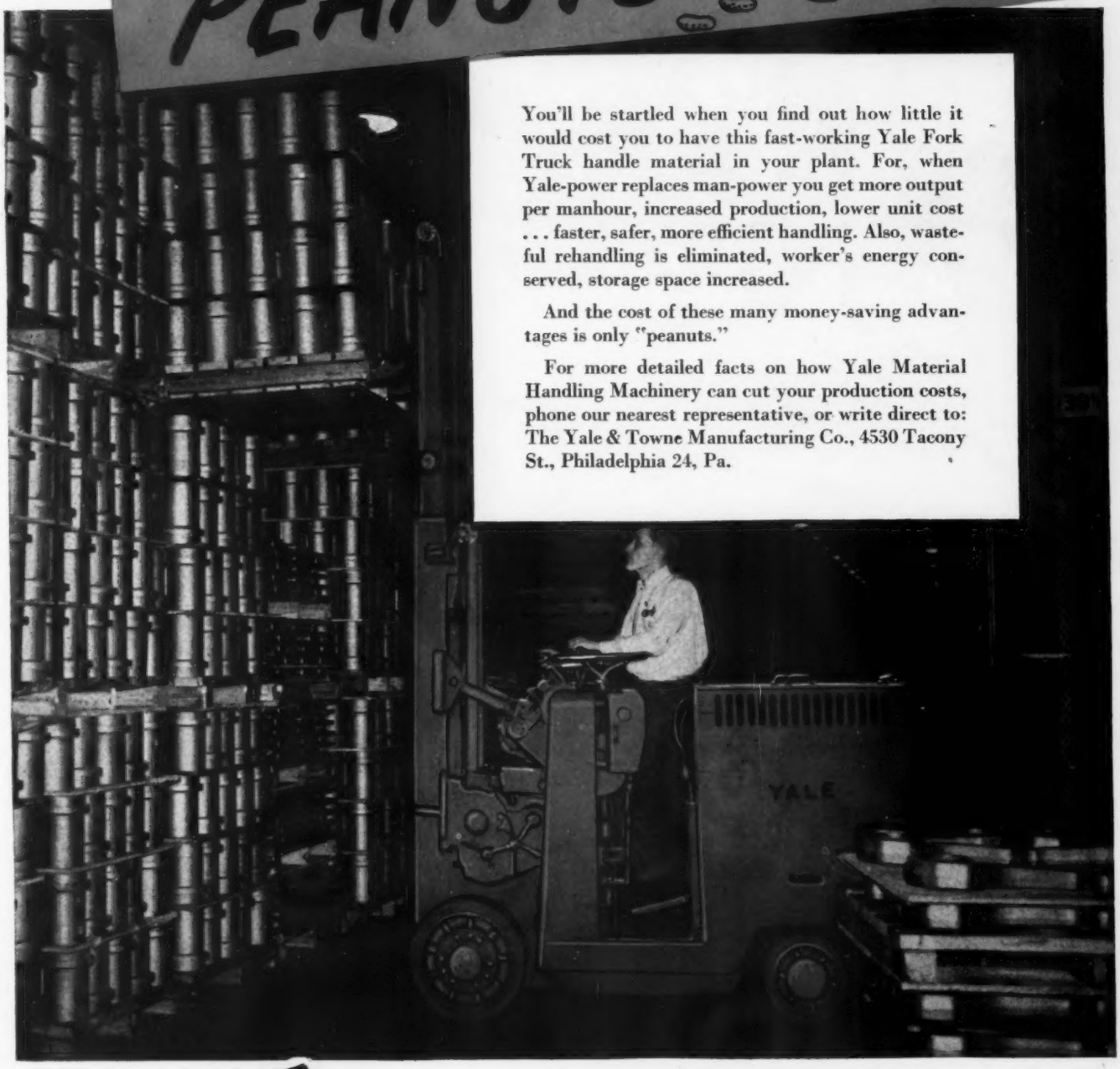
ONE WAY to approach the foot safety problem in your plant is to provide Safety Shoes of some brand that your men don't know—or perhaps don't like.

THE EASY WAY is to select Thom McAns, "the Safety Shoes that workers wear WILLINGLY"—because they already know and trust the Thom McAn name.*

THE EASIEST WAY OF ALL—"LET Thom DO IT"
Let us stock our Safety Shoes for you in our own Thom McAn retail stores, fit them with our own trained fitters, without cost or obligation on your part. You, freed of "shoe store problems," can concentrate on more important things, make yourself a more valuable man. Proof? Details? Write for them—today.

MORE MEN buy their shoes from **Thom McAn** than from **ANY OTHER** shoe store organization **IN AMERICA**

YOU CAN HIRE THIS FAST WORKER FOR PEANUTS



You'll be startled when you find out how little it would cost you to have this fast-working Yale Fork Truck handle material in your plant. For, when Yale-power replaces man-power you get more output per manhour, increased production, lower unit cost . . . faster, safer, more efficient handling. Also, wasteful rehandling is eliminated, worker's energy conserved, storage space increased.

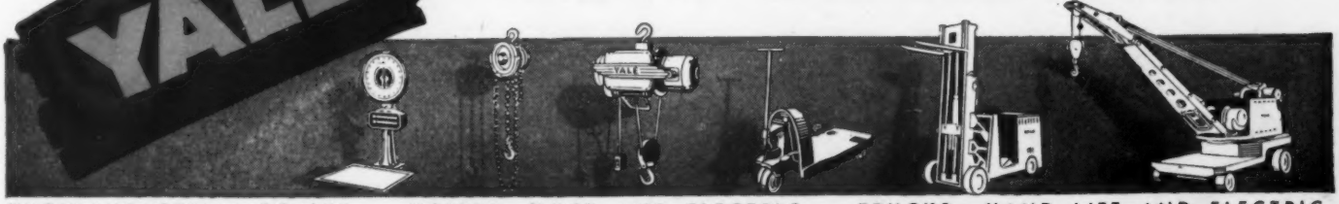
And the cost of these many money-saving advantages is only "peanuts."

For more detailed facts on how Yale Material Handling Machinery can cut your production costs, phone our nearest representative, or write direct to: The Yale & Towne Manufacturing Co., 4530 Tacony St., Philadelphia 24, Pa.

YALE

MATERIAL HANDLING MACHINERY

CUTS PRODUCTION COSTS . . . SAVES TIME . . . SAVES EFFORT . . . PROMOTES SAFETY



KRON INDUSTRIAL SCALES • HOISTS—HAND AND ELECTRIC • TRUCKS—HAND LIFT AND ELECTRIC

WHY IS RIGHT-ANGLE LOADING BETTER?

It assures longer bearing life . . .

Permits heavier radial and thrust loads . . .

Reduces load on each individual roller . . .

Cuts down service attention . . .

ROLLWAY Right-Angle-Loaded BEARINGS have *every one* of these advantages because they reduce every load to its component parts—*pure radial and pure thrust* . . . and carry *each* of these loads on a *separate* bearing assembly—AT A RIGHT ANGLE TO THE ROLLER.

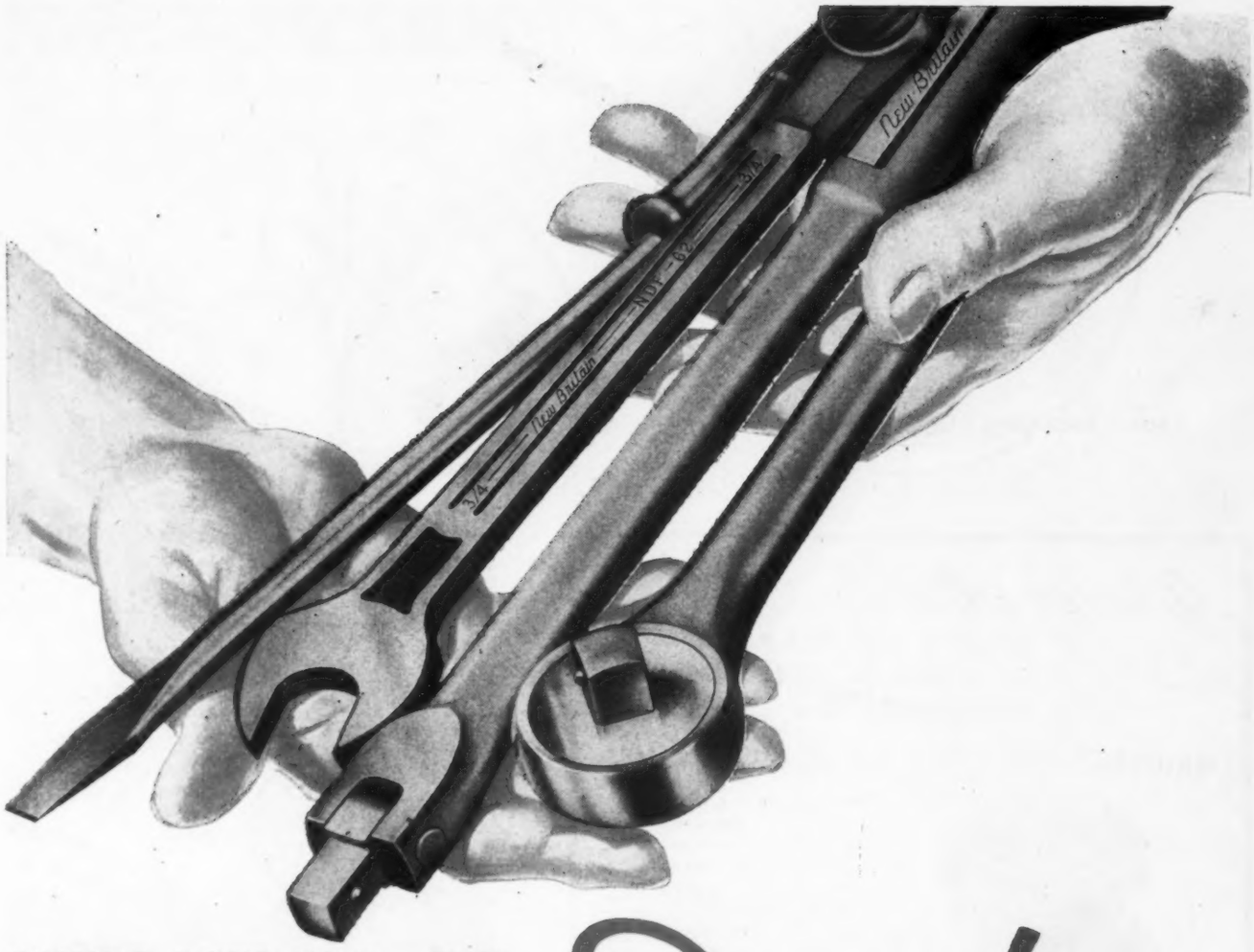
Because of this, Rollway Bearings can use solid cylindrical rollers of greater mass and cross-section area in a given space. Result: *increased load capacity . . . reduced maintenance attention . . . longer wear, with no pinching or wedging, less friction on roller ends.*

Send us your plans today for engineering analysis and bearing recommendations.

ROLLWAY BEARING CO., INC.
Syracuse, N. Y.

SALES OFFICES:
Philadelphia Boston Pittsburgh Youngstown Cleveland
Detroit Chicago St. Paul Houston Los Angeles

Rollway CYLINDRICAL ROLLER BEARINGS



COMING YOUR WAY...THIS FAMOUS LINE OF HAND TOOLS IN SENSATIONAL···

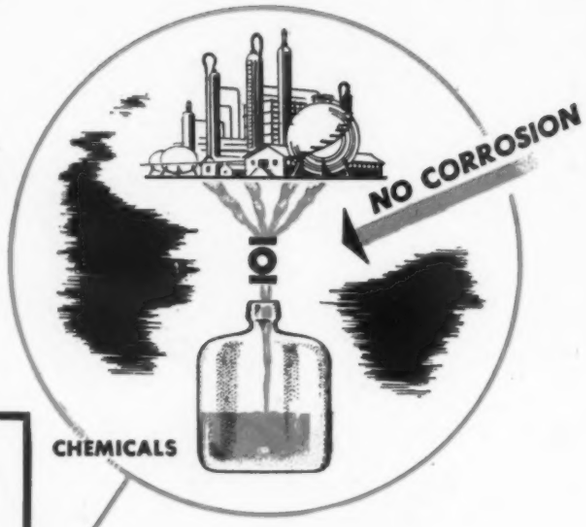
New Design

The new OVAL designing of New Britain Drive Parts throws out the useless bulk in old, round shapes and adds material where it is really needed—in the direction of strain! Extraordinary strength has been packed into slim, streamlined Handles with palm-fitted grips that are a revelation in "feel" and utility. Also coming, are bulk-free heads on modern Ratchets of startling reduced weight but amazing turning power, plus sure-action simplicity...you'll have new-day, precision balanced Screw Drivers and rugged Box and Open End Wrenches that breeze with ease through the toughest jobs in the tightest corners. Here, indeed, are Mechanics Hand Tools that make money! The New Britain Machine Co., New Britain, Conn.

The complete New Britain Line for Automotive, Aircraft, General Maintenance and Production Needs is sold by leading Jobbers.

New Britain

GREATER STRENGTH · BETTER FIT **HAND TOOLS**



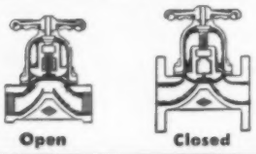
A Valve with . . .

★ ISOLATED WORKING PARTS
★ CORROSION-PROOF LININGS
★ STREAMLINED FLOW

GRINNELL-SAUNDERS DIAPHRAGM VALVES

● The flexible diaphragm isolates the working parts of the valve from the fluid, preventing contamination, and permits streamlined flow plus positive closure even with suspended solids.

A selection of diaphragm materials and also body linings of glass, porcelain, lead, rubber or synthetics protects against corrosion.



A TYPICAL EXAMPLE OF GRINNELL PIPING SERVICE

COMPLETE . . . EVERYWHERE

Products Manufactured

• Pipe and Tube Fittings • Engineered Pipe Hangers • Prefabricated Piping • Grinnell-Saunders Diaphragm Valves • Thermolier Unit Heaters • Job Work Casting • Automatic Sprinklers and other Fire Protection Systems • Amco Humidification and Cooling Systems • Other Piping Specialties

Supplier of . . .

• Pipe, Valves and Fittings • Specialties for Plumbing, Heating, Water Works and General Piping

GRINNELL COMPANY, INC.
Executive Offices
PROVIDENCE 1, RHODE ISLAND

GRINNELL

WHENEVER PIPING IS INVOLVED

ASBESTOS IN ACTION

Structural materials that always stay young...

K&M *"Century"* FLAT ASBESTOS-CEMENT SHEET MATERIALS

Design and construction by the Austin Company

• For rugged strength and staying-power, K&M "Century" Flat Asbestos-Cement Sheet materials are unbeatable. K&M Standard Asbestos Lumber and K&M Monobestos are two such products that grow *tougher* with age, never need maintenance, and practically last forever.

The most recent addition to the "Century" Flat Asbestos Sheet family is K&M "Century" APAC —a sturdy, light-weight material that's highly resistant to the common enemies of most building materials. Fire, rodents, termites, weather, rot . . . APAC withstands them all, and seems to stay eternally young. Its 4′ x 8′ sheets are ideal for many types of industrial construction, such as walls, partitions, ceilings, elevator shaft linings —in fact APAC has as many uses as a building has surfaces.

K&M "Century" Flat Asbestos Sheet Materials hold the right answer to many construction problems. Write to us for full information on what they can do for YOU.

K&M best in asbestos

Nature Made Asbestos...
Keasbey & Mattison has been making it serve mankind since 1873

KEASBEY & MATTISON
COMPANY · AMBLER · PENNSYLVANIA

*George Armstrong Custer, one of our youngest and most gallant Brigadiers, died with his men at the Little Big Horn, Montana Territory, June 25, 1876.

29 Years Before Custer's Last Stand*. . . CHASE was manufacturing Better Bags

• Years before the Indian Campaigns, when army supply trains carried precious supplies in bags, Chase was one of the country's leading manufacturers of textile bags. 1947 marks one hundred years' *experience* in this business.

This experience is important to you because it assures you better containers for your products. It'll pay you to check with your Chase Salesman, for Chase makes bags of all kinds—each container specifically designed for more economical and more efficient packing of *your product.*

Remember, for Better Bags . . . better buy Chase. It's more than a slogan, more than a catch phrase—it's your positive assurance of an improved container.

COTTON BAGS • TOP MILL BURLAP BAGS SAXOLIN OPEN MESH BAGS • PROTEX BAGS • MULTIWALL AND OTHER PAPER BAGS • PROTECTIVE PAPERS

One Hundred Years of Experience in Making Better Bags for Industry and Agriculture.

CHASE BAG CO.

GENERAL SALES OFFICES
307 WEST JACKSON BLVD., CHICAGO 6, ILL.

BOISE • BUFFALO • CHAGRIN FALLS, O. • CLEVELAND • CROSSETT, ARK. • DALLAS • DENVER • DETROIT • GOSHEN, IND. • HARLINGEN, TEXAS • HUTCHINSON, KAN. • KANSAS CITY • MEMPHIS • MILWAUKEE • MINNEAPOLIS • NEW ORLEANS • NEW YORK • OKLAHOMA CITY • ORLANDO, FLA. • PHILADELPHIA • PITTSBURGH • PORTLAND, ORE. • REIDSVILLE, N. C. • ST. LOUIS • SALT LAKE CITY • TOLEDO

F.O.B. filosofy of buying

MILITARY AUTHORITIES say that the next war—if, as and when we may be subjected to such a catastrophe — will last approximately forty minutes. That simplifies the problems of conversion, reconversion, and controls. However, none of our political authorities has given any assurance of similar dispatch in respect to the cleaning up of postwar details.

• •

THERE'S AN advertising manager of our acquaintance who for many years has steadfastly—and even militantly—expounded his belief that the purchasing agent exercises no powers of selection and decision, but follows the buying instructions of the engineering division, whose superior technical knowledge and judgment must perforce be the infallible guide in determining what and where to buy. (He's not alone in subscribing to this theory, though the number of its proponents is getting fewer year by year as marketing executives learn more of the facts about how industry buys.) In support of his contention he has pointed to his own company's practice. You can't very well confute that argument, beyond pointing out the fallacy of jumping to broad generalizations from one particular instance that is far from being either representative or sound; one swallow doesn't make a summer, nor even a satisfying drink. Within the past few weeks there has been a reshuffling of personnel in his organization. Among the changes reported, the fellow who has heretofore headed the mechanical engineering department has been appointed purchasing agent. Now arises an interesting question. Presumably this engineer has been one of those whose technical judgment is credited with the determination of purchasing decisions. Are we to assume that upon his transfer to the purchasing office, his technical judgment is henceforth to be disregarded and that from this point on he will take his instructions from the former assistant who succeeds him in engineering? That's the theory, but it doesn't make sense.

• •

ROBERT NATHAN, economist, has come forth with a report on the theme that rising costs do not entail higher prices. It is to be used by the CIO (which "retained" Mr. Nathan's services) as the basis for new wage demands. An earlier report on the same theme, from the same source, under government auspices, was successfully used for the same purpose a few months ago, though it was subsequently discredited as "unofficial". The facts are against Mr. Nathan. Witness a recently published purchasing report from the Erie Railroad, which shows a bakers' dozen of items in common use, that have gone up substantially in price since 1941:

Brake shoes	up	35.8%
Couplers	"	50.9%
Fuel coal	"	59.0%
Lumber	"	73.6%
Signal torpedoes	"	21.4%
Track brooms	"	37.5%
Lantern batteries	"	13.8%
Rails	"	19.8%
Ballast stone	"	8.3%
Lantern globes	"	6.4%
Cotter pins	"	16.7%
Wiping waste	"	100.0%
Nails	"	129.6%
Cast iron wheels	"	23.8%

A supplementary list cites thirty-three additional items that have advanced in price, on the average, by 33.44%, ranging all the way from black locomotive paint, up 4.2%, to brake clubs, up 104.8%.

The purpose of the Erie report is two-fold. Within the organization it supports a plea for conservation and waste reduction. For external consumption, it supports a plea for higher freight rates. Which is a reminder that the non-railroad buyer, in addition to these and similar material price increases that he shares with all buyers, has already incurred substantially higher transportation costs and faces the probability of a further advance. Mr. Nathan's brochure doesn't have the answer to the problem of how all this is going to fit within a fixed price pattern.

ECONOMICS professes to be a science. The scientific method is to take all known facts and to derive from them an objective conclusion. There is ample reason for any industry or group or government to retain the services of competent economic scientists on this basis. But during the past several years there has been altogether too much of a tendency to retain economists as lawyers are retained, to gather selective facts in support of some desired end and to becloud the rest of the picture. The "conclusion" in such cases is in fact the starting point. It is a form of intellectual dishonesty that does scant honor to the economic profession. It is the antithesis of the scientific method, and it is giving us a dangerously shaky foundation on which to build the postwar world.

• •

A NEW P. A. Association has been organized among the industries of the Mahoning and Shenango Valley area, centering around Youngstown, Ohio. In the interests of simplicity and brevity, it is to be known merely as the Valley Purchasing Agents Association. We seem to detect a few raised eyebrows among the members of the established Lehigh Valley, Saginaw Valley, and Rock River Valley Associations.

• •

ECONOMISTS and business statisticians are exhibiting keen interest in the fact the national birth rate has zoomed up to 29 per 1,000 of population, or about 60% above the prewar rate. And it is more than a Winchellian interest, for when this phenomenon is projected in terms of demand for goods and housing and education it presents a significant pattern of needs and markets extending well into the 1970s. The peak of demand moves along with the growing youngsters. Today, and at least through 1950, it's the baby stuff that will be needed in biggest volume. Children's clothing, toys and equipment will be the big field through the 1950s. Then the teen-agers will have their inning. And during the 1970s this unprecedented crop of babies will be in the young adult stage, starting their own new homes and families. No doubt about it, this war started something.

one source of supply
one mark...dependability
one aim...satisfaction

25 YEARS OF STEADFAST SERVICE TO BUYERS OF BOLTS, NUTS, SCREWS, RIVETS, WASHERS

25th Anniversary 1921-1946

STERLING BOLT COMPANY
213 W. JACKSON BLVD. • CHICAGO 6, ILLINOIS
MILWAUKEE—161 WISCONSIN AVE. • CINCINNATI—UNION TRUST BUILDING

New Sturtevant Dry-Batch Mixers

★ *Increase Output, Cut Costs*

★ *4-Way Mixing Action Assures Thorough Blends*

★ *Open-Door Accessibility Permits Fast, Easy Cleaning*

The new, improved Sturtevant dry-batch mixers thoroughly and efficiently mix two or more substances into a homogenous and inseparable whole, every part of which has the same analysis. The 4-way mixing action does a more rapid mixing job than other machines. The single receiving and discharging opening permits tight sealing during the mixing process. Open-door accessibility permits thorough cleaning.

The mixer is simple and easy to operate . . . hand lever controls both receiving and discharging. These efficient Sturtevant dry-batch mixers are available in five sizes with mixing capacities from 7½ tons to 75 tons per hour. Write for bulletin and complete information today.

Receiving — The ingredients to be mixed enter the mixing chamber of the drum through a chute. Note scoops which carry up and dump the ingredients as the drum rotates.

Discharging — By simply throwing a lever, the inlet is closed and the mixer is in discharging position. The completely mixed materials drop off the lifting scoops and discharge through chute without segregation of ingredients.

STURTEVANT
MILL COMPANY
107 Clayton Street, Boston 22, Mass.

Designers & Manufacturers of

CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

Remember this...

THREADWELL TAPS ARE

1 machined
2 hardened
3 COLD-TEMPERED (at 120° below zero)
4 ground finished
5 flute-polished
6 greaseless rust-proofed
7 tested
8 inspected·
9 "i-dot-ified"*
10 "tap-capsuled"**

—*all* for one purpose—to give you such outstandingly better threading service that you'll remember *Threadwell every time you need a tap.*

All the *Threadwell* distributor in your locality asks is that you give *Threadwell* Taps a try. He'll cheerfully stake his chances for re-orders on *your* size-up of their extra performance and convenience.

**Red* dot on the shank to identify cut thread, *white* dot for commercial ground, *blue* dot for precision ground.

***Each *Threadwell* ground thread tap comes in an individual metal-capped, transparent plastic tube that protects it from dirt or damage and permits quick selection of type and size without unwrapping or handling.

DISTRIBUTORS IN LEADING INDUSTRIAL CENTERS THROUGHOUT THE UNITED STATES AND THE WORLD

Threadwell
SINCE 1902
"TAPS OF DISTINCTION"

THREADWELL TAP AND DIE COMPANY • GREENFIELD, MASSACHUSETTS, U. S. A.

CALIFORNIA OFFICE, THREADWELL TAP & DIE CO. OF CALIF., 1322 SANTA FE AVE., LOS ANGELES 21

You See at Once That the SIDE of a V-BELT is the part that GETS the WEAR

DIAGRAM OF V-BELT IN SHEAVE

Naturally so, because the sides of a V-belt do all the gripping on the pulley. They get all the wear against the sheave groove wall.

It's the sides, too, that pick up all the power delivered by the driver pulley. The sides transmit that power to the belt as a whole. And then, once more, it's the sides--and the sides alone--that grip the driven pulley and deliver the power to it.

That is why you have always noticed that the sidewall of the ordinary V-Belt is the part that wears out first.

---and Now See How the CONCAVE SIDE

(A GATES PATENT)

✓ REDUCES Sidewall WEAR

Greatly Lengthening Belt Life!

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt.

The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the middle of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

✓MORE Important NOW Than ever Before!

Now that Gates Specialized Research has resulted in V-Belts having much stronger tension members -- tension members of Rayon Cords and Flexible Steel Cables, among others--the sidewall of the belt is often called upon to transmit to the pulley much heavier loads. Naturally, with heavier loading on the sidewall the life-prolonging Concave Side is more important today than ever before!

THE GATES RUBBER COMPANY, DENVER, U. S. A.
World's Largest Makers of V-Belts

Straight Sided V-Belt

How Straight Sided V-Belt Bulges When Bending Around Its Pulley

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley

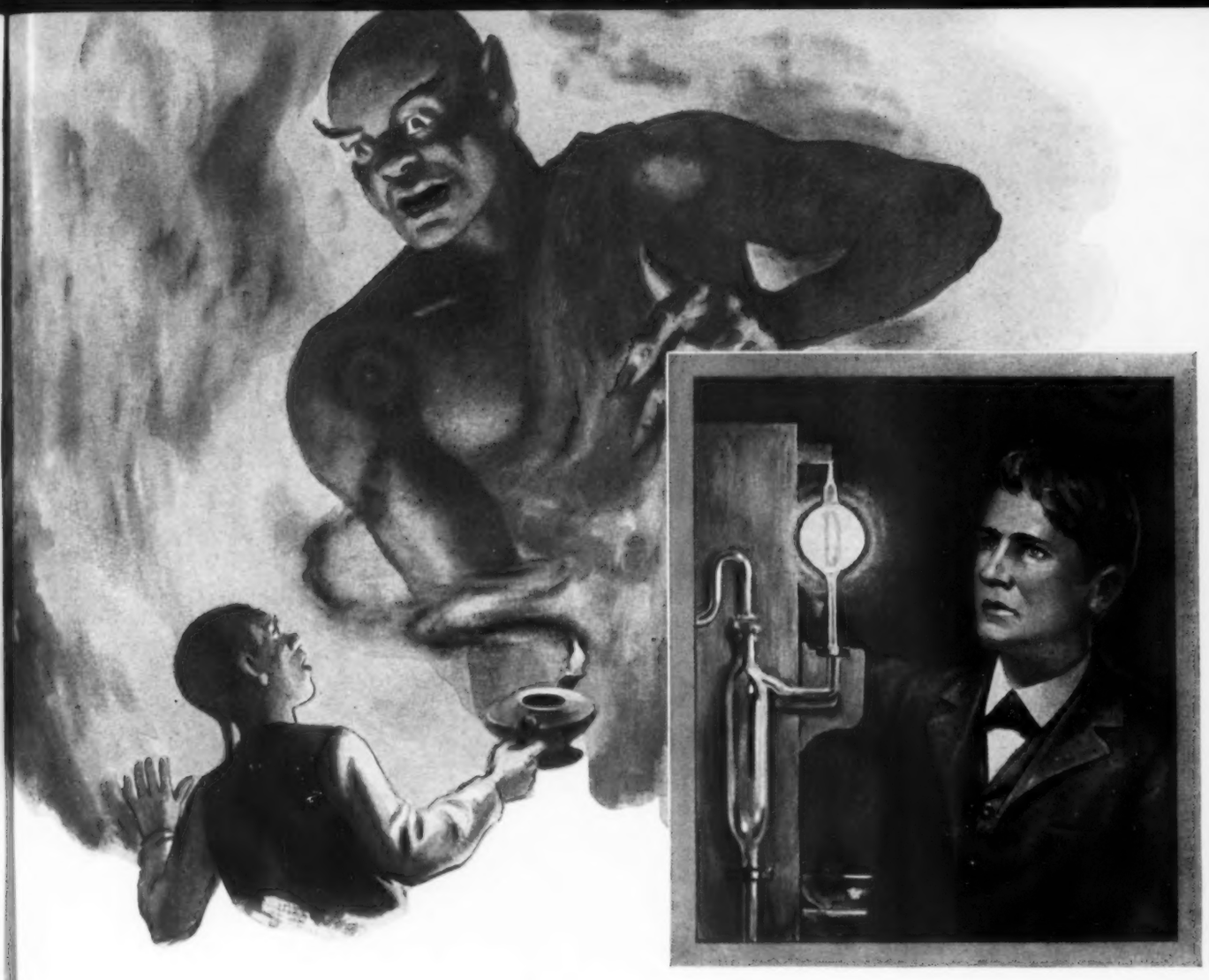
No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

472

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

Gates — THE MARK OF SPECIALIZED RESEARCH



IT WAS EDISON, NOT ALADDIN WHO REALLY HAD THE LAMP!

"ALADDIN'S LAMP" made good reading but gave little illumination to a light-hungry world. It was the tiny glow of Edison's incandescent lamp that expanded into the radiance which floods the globe.

Hard on the heels of Edison's invention came the need for transmitting electricity, economically, over long distances. Thus, the development of alternating current in the 1880's enabled this young nation to set the pace in the whole realm of electricity. For here was an economical means of transmitting electrical energy at high voltages and with low losses—not only for light, but also for the heat and power on which the growth of industry thrived.

Then, as now, electricity and copper were inseparable... and The American Brass Company was already a leading supplier of copper, brass and bronze. Today, with more than a hundred years of manufacturing experience behind it, this Company continues its help in working out many of the metal problems peculiar to the electrical equipment and appliance industries... and to the fields of electric power generation, distribution and control.

46161

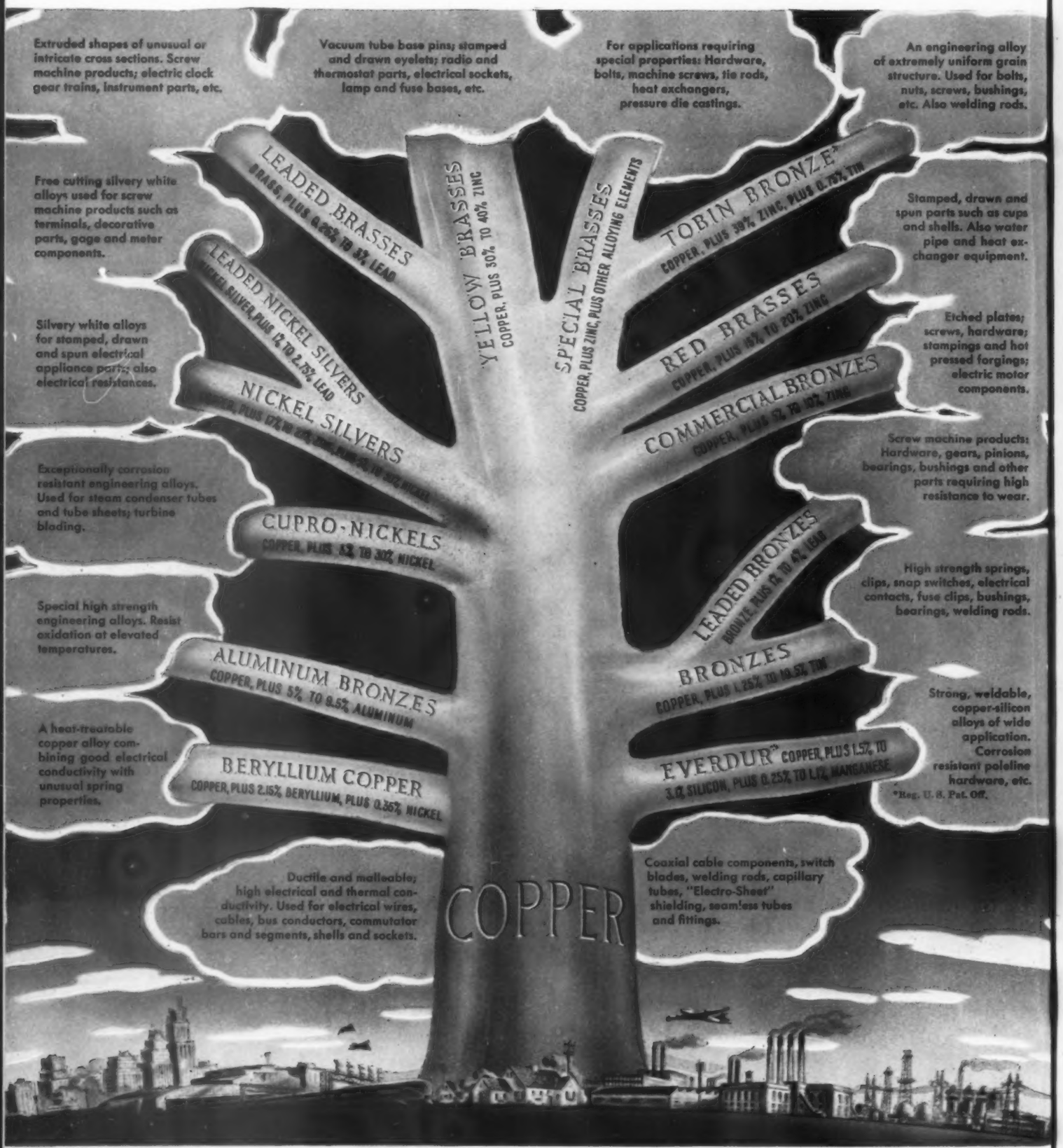
THE AMERICAN BRASS COMPANY
***General Offices:* Waterbury 88, Connecticut**

ANACONDA from mine to consumer

Anaconda Copper & Copper Alloys

In the Electrical Industry

Nothing serves like Copper and its Alloys


Extruded shapes of unusual or intricate cross sections. Screw machine products; electric clock gear trains, instrument parts, etc.
Vacuum tube base pins; stamped and drawn eyelets; radio and thermostat parts, electrical sockets, lamp and fuse bases, etc.
For applications requiring special properties: Hardware, bolts, machine screws, tie rods, heat exchangers, pressure die castings.
An engineering alloy of extremely uniform grain structure. Used for bolts, nuts, screws, bushings, etc. Also welding rods.
Free cutting silvery white alloys used for screw machine products such as terminals, decorative parts, gage and meter components.
LEADED BRASSES
BRASS, PLUS 0.25% TO 3% LEAD
YELLOW BRASSES
COPPER, PLUS 30% TO 40% ZINC
SPECIAL BRASSES
COPPER, PLUS ZINC, PLUS OTHER ALLOYING ELEMENTS
TOBIN BRONZE*
COPPER, PLUS 39% ZINC, PLUS 0.75% TIN
Stamped, drawn and spun parts such as cups and shells. Also water pipe and heat exchanger equipment.
LEADED NICKEL SILVERS
NICKEL SILVER, PLUS 1% TO 2.75% LEAD
RED BRASSES
COPPER, PLUS 15% TO 20% ZINC
Silvery white alloys for stamped, drawn and spun electrical appliance parts; also electrical resistances.
Etched plates; screws, hardware; stampings and hot pressed forgings; electric motor components.
NICKEL SILVERS
COMMERCIAL BRONZES
COPPER, PLUS 5% TO 10% ZINC
Screw machine products; Hardware, gears, pinions, bearings, bushings and other parts requiring high resistance to wear.
Exceptionally corrosion resistant engineering alloys. Used for steam condenser tubes and tube sheets; turbine blading.
CUPRO-NICKELS
COPPER, PLUS 5% TO 30% NICKEL
LEADED BRONZES
BRONZE, PLUS 15 TO 45% LEAD
High strength springs, clips, snap switches, electrical contacts, fuse clips, bushings, bearings, welding rods.
Special high strength engineering alloys. Resist oxidation at elevated temperatures.
ALUMINUM BRONZES
COPPER, PLUS 5% TO 9.5% ALUMINUM
BRONZES
COPPER, PLUS 1.25% TO 10.5% TIN
A heat-treatable copper alloy combining good electrical conductivity with unusual spring properties.
BERYLLIUM COPPER
COPPER, PLUS 2.15% BERYLLIUM, PLUS 0.35% NICKEL
EVERDUR* COPPER, PLUS 1.5% TO 3.0% SILICON, PLUS 0.25% TO 1.1% MANGANESE
Strong, weldable, copper-silicon alloys of wide application. Corrosion resistant poleline hardware, etc.
*Reg. U. S. Pat. Off.
Ductile and malleable; high electrical and thermal conductivity. Used for electrical wires, cables, bus conductors, commutator bars and segments, shells and sockets.
COPPER
Coaxial cable components, switch blades, welding rods, capillary tubes, "Electro-Sheet" shielding, seamless tubes and fittings.

ANACONDA
from mine to consumer

Made by THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut • Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

Artist – Fred Kabotie, native of Arizona

ARIZONA—*annual purchases: $300 million—mostly packaged.*

CONTAINER CORPORATION OF AMERICA

SAVE WASTE PAPER

WALWORTH

Pipe Fittings

A complete line of standardized types in

STEEL

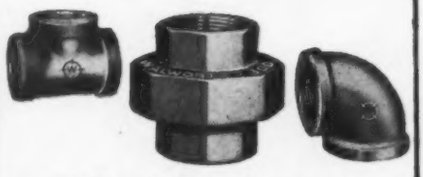
in series 150 to 1500

Cast Steel Fittings

Steel Welding Fittings

Forged Steel Flanges

BRONZE



125 Lb and 250 Lb, Screwed ends

150 Lb and 300 Lb Walseal ends

3,000 Lb O.W.G., Walseal ends

IRON

125 Lb and 250 Lb Cast Iron

150 Lb Malleable Iron

300 Lb Malleable Iron

Walworth's comprehensive line of pipe fittings is made in a wide range of types and sizes to meet every piping requirement. A few of the many regular Walworth fittings are illustrated above. All Walworth fittings are made to the highest standards of quality, both as to dimensional accuracy and metallurgical properties. In design, construction, and performance, they reflect Walworth's 103 years' experience in the manufacture of quality valves and fittings.

For detailed information on Walworth's complete line of valves, fittings, and pipe wrenches, see your local Walworth distributor or write for a free copy of Catalog 42.

WALWORTH
valves AND fittings
60 EAST 42nd ST., NEW YORK 17, N. Y.

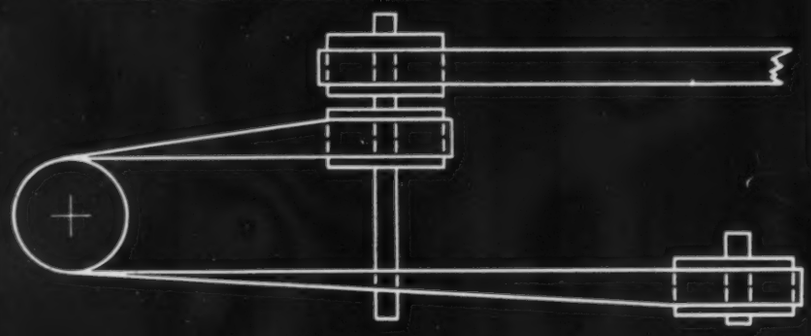
LABORATORY CONTROL

To assure strict adherence to specifications, sample test bars of the metals from which Walworth Pipe Fittings are made are subjected to regular testing in Walworth laboratories. These and other regular controls and inspections assure the high quality of all Walworth Pipe Fittings. The illustration shows a test on a cast iron transverse bar.

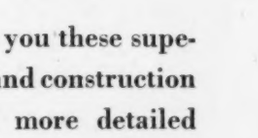
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

G.T.M.-Specified

GOODYEAR INDUSTRIAL RUBBER PRODUCTS



MILL-PROVED MONEY SAVERS



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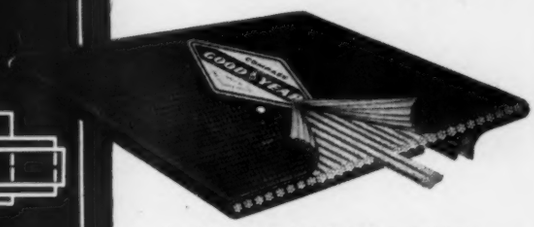

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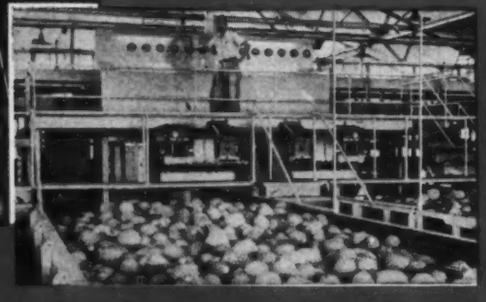
"MOTOR-DRIVE IS MORE THAN POWER"

V★S-equipped conveyors exactly match the speeds of auto bodies and chassis assembly operations.

Modern furniture plants find in V★S-equipped conveyors the ideal answer to faster finishing schedules.



Operator of central V★S panel controls 14 feeder-conveyors independently — delivers pineapples to main conveyor as needed.

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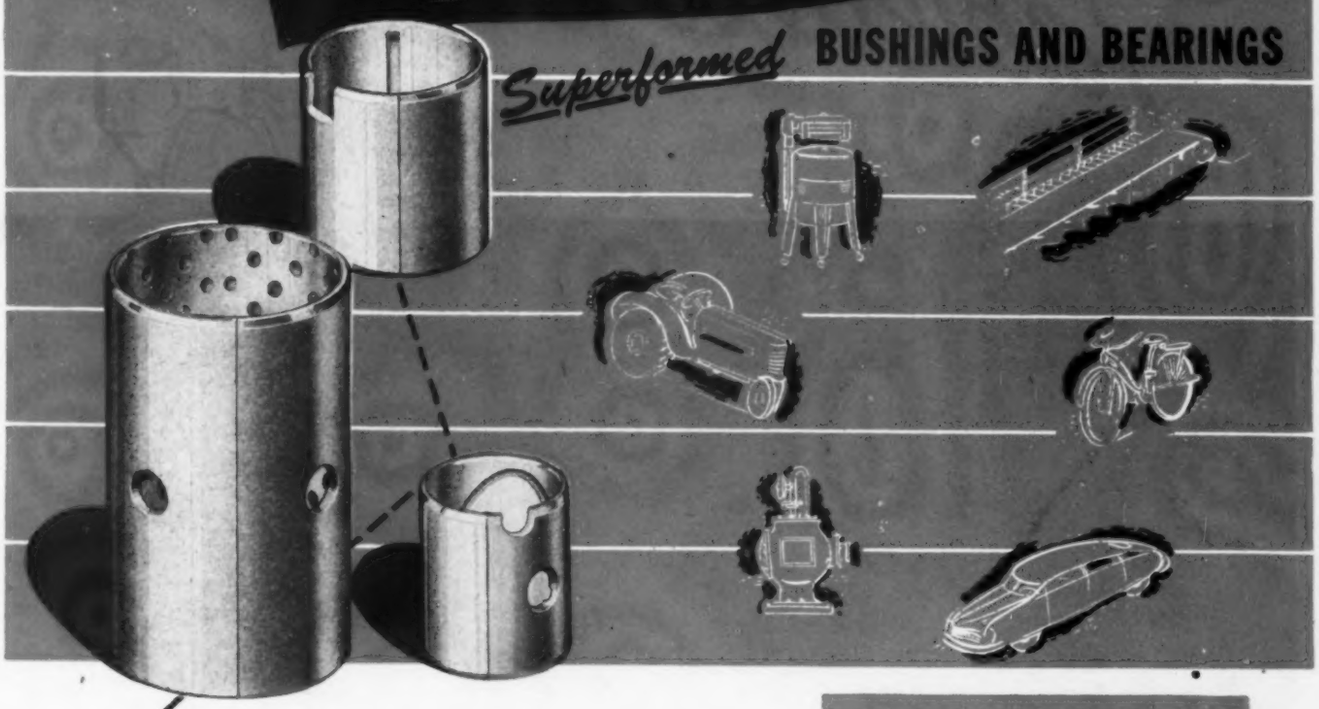

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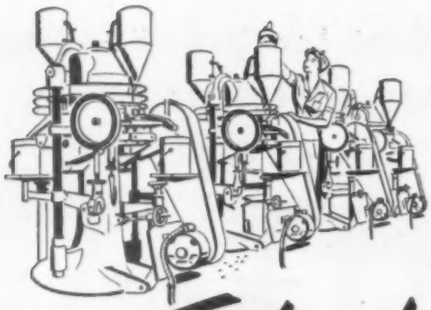
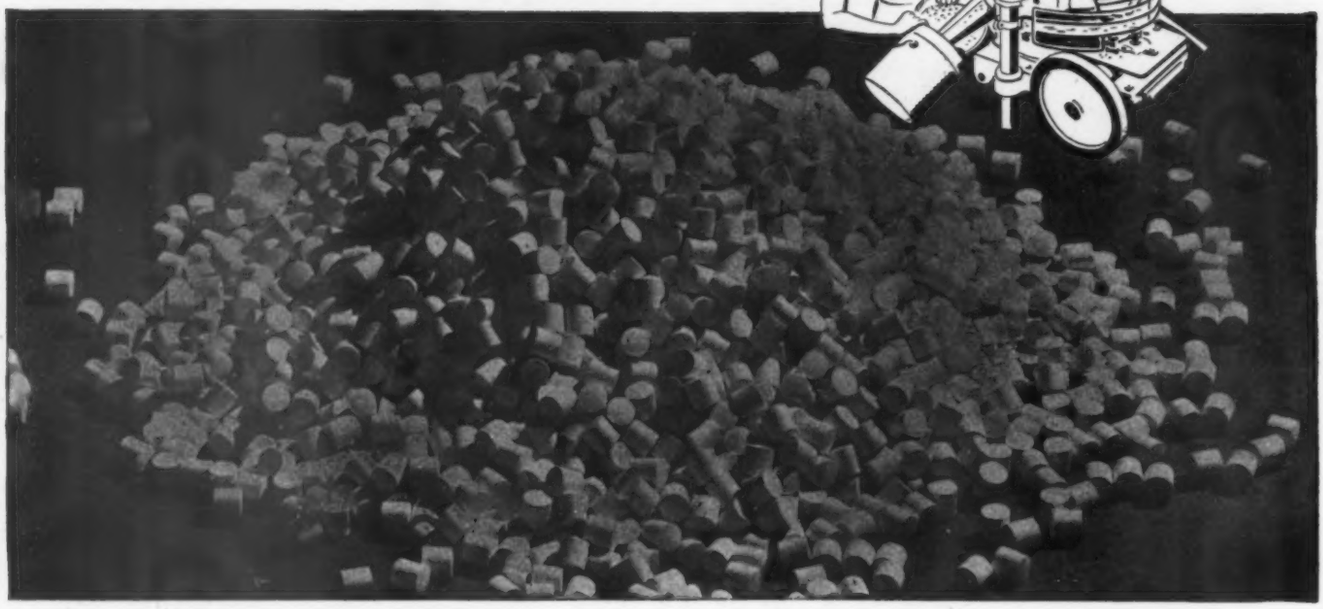


Tabletted Catalysts



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cuts new exhaust fan bearing unit

- **25% in weight**
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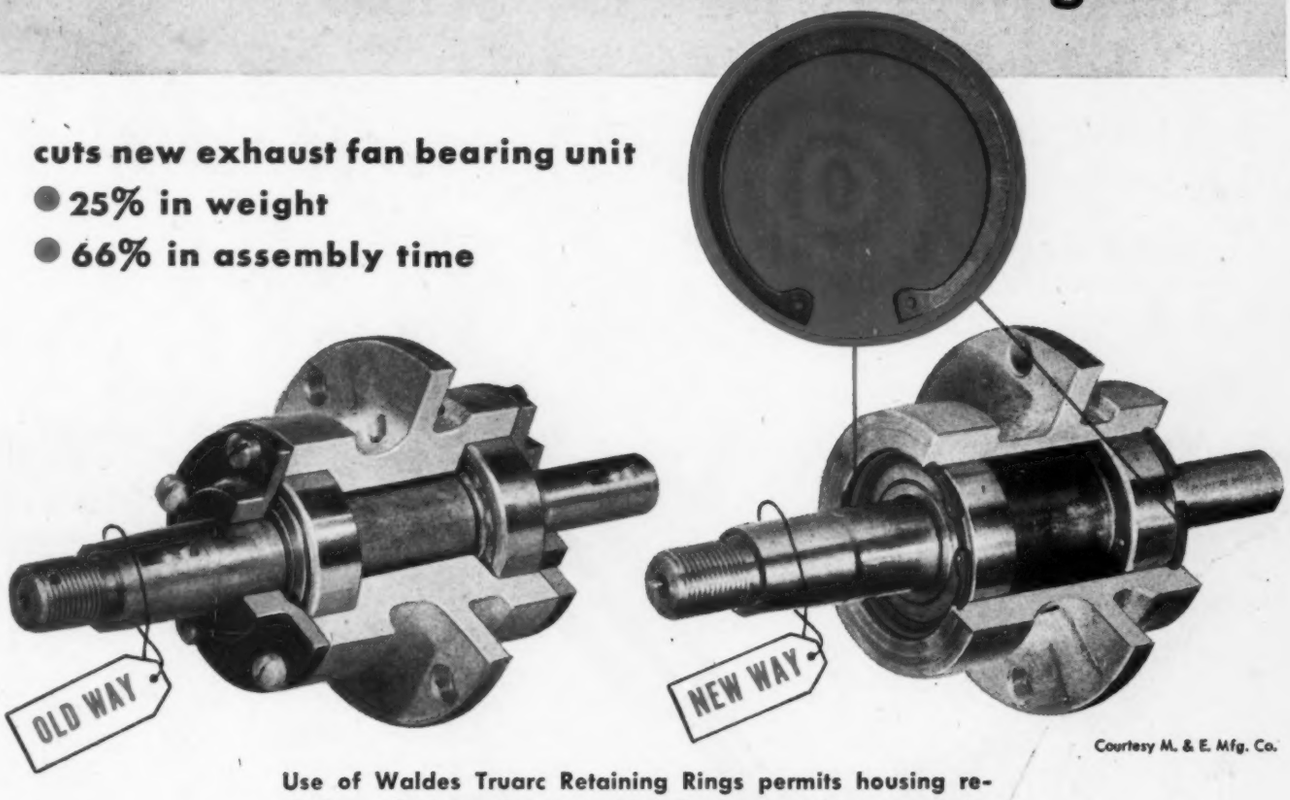

Courtesy M. & E. Mfg. Co.

Use of Waldes Truarc Retaining Rings permits housing redesign—eliminates heavy cast bearing caps and screws requiring drilling and tapping; lowers labor and material cost.

"TRUARC PAYS DIVIDENDS IN SAVINGS!" declares M. & E. Manufacturing Company, of Indianapolis, makers of exhaust fans for industry. "Improvements in design made possible by Waldes Truarc Retaining Rings provide a quieter, freer-running assembly, assure longer life to the entire unit, eliminate the hazards of uneven unnecessary pressure on the bearing and minimize future service requirements. In our experience Truarc has definitely proved itself the better method for doing an important job."

Truarc does a better job on axles and shafts for retaining and positioning wheels, pulleys, cams and gears. In widely varied applications, designers find its never-failing grip, its patented design that assures constant circularity, make Truarc the better way to hold machine parts together. Production and maintenance men in many industries see how Truarc rings cut costs sharply, maintain accurate, unvarying relationship of parts. Send us your drawings; Waldes Truarc engineers will be glad to show how Truarc can help you.

WALDES

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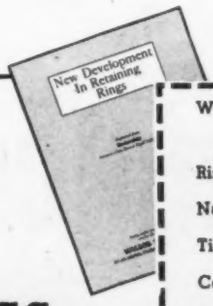
RETAINING RINGS

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK



● ***Send for new Truarc booklet, "New Development In Retaining Rings"***

Waldes Kohinoor, Inc., 47-10 Austel Place 30-K
Long Island City 1, N. Y.

Please send booklet, "New Development In Retaining Rings" to:

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why change drivers in the MIDDLE of a job?

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Heat Treated
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TAKE the heat treating, cleaning and straightening 'stops' out of the smooth flow of your parts production with Wyckoff Heat Treated Cold Finished Steel.

Machine your highly stressed parts from Wyckoff Heat Treated Steels that possess the required physical properties—without interrupting production to create these properties and without worry about distortion.

Wyckoff Heat Treated Steel is furnished to your individual requirements—gives pre-determined uniformity of production stock that makes every part machine the same . . . perform the same . . . eliminates laborious hardness testing of finished parts.

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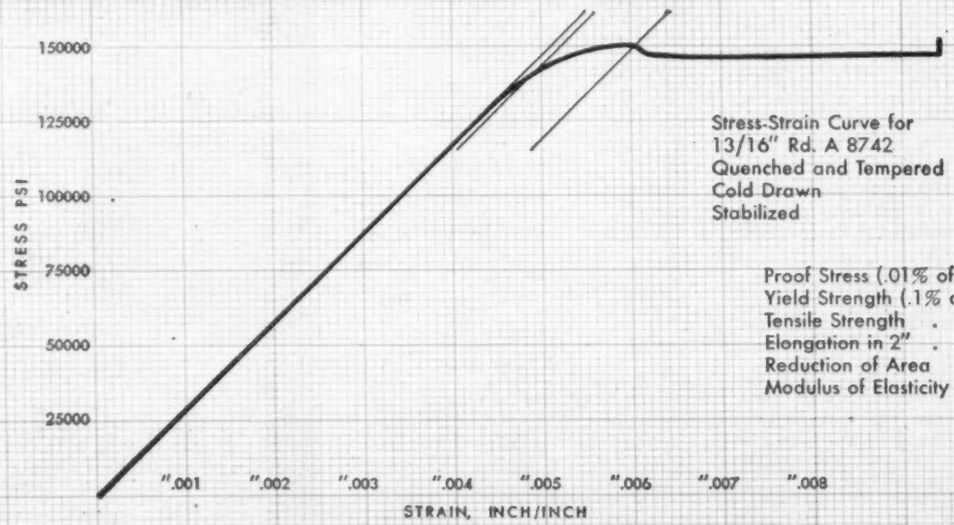

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13/16" Rd. A 8742
Quenched and Tempered
Cold Drawn
Stabilized

Proof Stress (.01% offset)	144,500 psi
Yield Strength (.1% offset)	151,000 psi
Tensile Strength . . .	152,500 psi
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NEW!

a cold run, fast setting RESIN WOOD glue...

that can be handled and worked in 20 minutes

WOOD-LOK* challenges all wood glues! It is the only type of resin glue that can be handled and machined after a clamping time of 20 to 30 minutes *instead of 6 to 8 hours!* It sets with a speed comparable with hot animal glue.

WOOD-LOK* is cold run. Its bonding quality is never weakened by constant reheating. It's a liquid — *ready for use.* Nothing has to be added, soaked, heated.

WOOD-LOK* does not harden in the pot. Its characteristics never change during shipment, application or use. Its storage and working life is months — not 3 to 4 hours.

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WOOD-LOK* is durable. Humidity changes will not cause it to embrittle. It remains resilient — and never forms a rock hard abrasive film to dull saws and knives.

Amazing? There's nothing else like it. It'll shorten your assembly lines, free floor space, speed production, stop glue waste, produce stronger and more durable finished woodwork.

What's the color range of WOOD-LOK* glues? From uniformly controlled pure white *which dries colorless . . . leaves no glue line* to darker shades designed for specific uses.

WOOD-LOK* is made by National Adhesives — a specialist for half a century in all types of industrial adhesives and a pioneer in the development of synthetic resin adhesives. It's a wartime 'RESYN' development.

WOOD-LOK* is available — NOW! Address: National Adhesives, 270 Madison Avenue, New York 16; 3641 So. Washtenaw Avenue, Chicago 32; 735 Battery Street, San Francisco 11; and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto. In England: National Adhesives, Ltd., Slough.

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For Joint Assembly Operations . . . where limited clamping time or rub joints are necessary to speed production . . . or where an economically applied, fast setting, durable bond is required to produce:

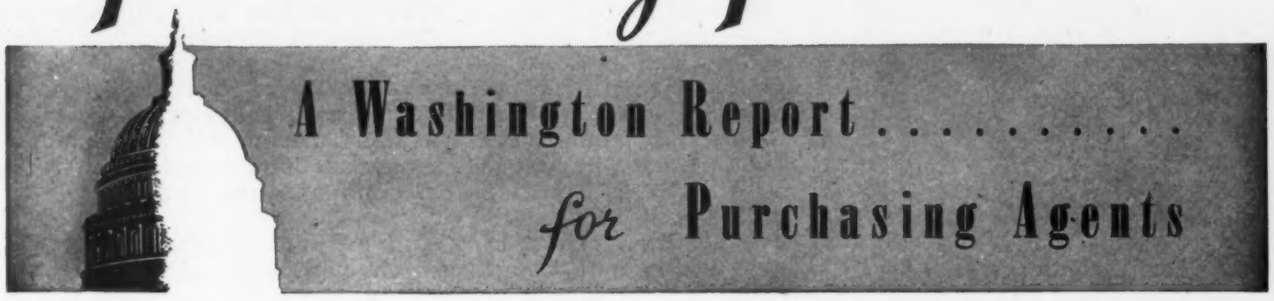
Radio and Music Cabinets • Pencils • Display Cases and Cabinets • Lock Corner Boxes • Dowel Work • Caskets • Kitchen Cupboards • Instrument Cases • Ping Pong Tables • Suitcase Boxes • Wood Patterns • Bar and Restaurant Fixtures • Wood Novelties and Toys • Humidor Boxes • Toilet Seats • Picture Frames • Wood Trays • Bookcases • and other products

STUDY THESE PHOTOS OF WOOD-LOK* IN ACTION

National ADHESIVES

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE

Purchasing Previews



FEBRUARY 1, 1947

WAR EXPANSION TO BE PARED IN READJUSTMENT . . . .

Index of what is likely to happen during the crucial six to eight months ahead can best be seen in the distortions of the industrial pattern created by the war.

A number of new producers and enlargement of existing production were brought into the picture. There was less regard for economic factors, and greater emphasis on security factors. This meant that a number of the new producing facilities were built without regard to the normal considerations of a competitive economy. Proximity to consuming markets was overlooked — because the entire nation was a consumer market. Economy in transportation was made subsidiary to the danger of enemy attack. Availability of labor was not directly considered, in that workers could be recruited through Government measures without regard to the peacetime freedom of labor movement.

Result insofar as plant capacity is concerned is that there will be readjustment, with some plant units failing in the economic race that is ahead. Plant enlargements by producers who have insufficient sales outlets and marketing organizations will be subject to some scaling down.

Military considerations — plus some public and political considerations — resulted in small producers getting greater price latitude on war goods than larger producers. Now all producers will have to toe the competitive price line.

DISTORTIONS IN PROCUREMENT . . . .

Just as normal considerations were sacrificed in expansions, the impact on the purchasing agent was similarly contrary to best accepted practice. Purchasing practices were dictated by a Government rationing which variously took the guise of priorities, allocations, and consent to acquire.

Emphasis was on acquisition, with prices set on the one hand by Government on raw materials, and again by Government in the final purchase of the bulk of completed goods.

In view of the controls exercised by Government, it was primarily incumbent on the purchasing agent to insure supply, which meant a close regard to the various control systems.

Every seller resorted to contractual devices to protect his price return against arbitrary action of the Government in regard to prices. A considerable quantity of industrial raw materials — hides, fibers, rubber, etc. — was either owned by or purchased by the Government.

These conditions resulted in distortions in purchasing practices. While sellers' prices were controlled by Government — and in many cases deliveries were controlled by Government orders — the sellers controlled all other

conditions of sales. The sales were made at the sellers' convenience. It was obviously a sellers' market — and over a long period of time. Where normally, markets shift from one position to another, and are neither a sellers' nor a buyers' market for a sufficient period of time to leave a marked imprint on commercial practices — the sellers' market was paramount over a period of approximately six years — and many practices favoring the seller became entrenched.

Obvious example is the widespread use of escalation. Another is the fact that purchasing organizations were organized in accordance with the best interests of the seller. This meant decentralization so that the buyer through field staffs would be in constant contact with the seller.

The reverse is a centralization of procurement — with the seller seeking out the buyer through extensive sales organization.

WAGES VERSUS PRODUCTIVITY AS PRICE FACTOR . . . .

Most controversial of all is the trend in prices which will take place during the period ahead. Competitive factors will certainly squeeze out speculative price levels, but it is generally felt that prices will continue to be considerably higher than during the comparatively high price period of 1941.

Cost of living indexes should show a marked drop, primarily through an adjustment in food prices — and through the reappearance of lower price clothing lines. The prices of these lower price lines will be markedly higher than prewar, but their availability will result in consumer saving.

At the same time, wage increase factors have far outstripped any improvement in productivity.

Much of the justification for wage boosts has been the claim of greater productivity — a claim which has not been substantiated in any but the industries which had no reconversion problem.

This means that the wage boosts which have been granted will tend to keep prices high — and they will remain high until productivity increase brings them down.

LABOR DISTORTION DUE FOR CORRECTION . . . .

One further distortion which had a drastic effect on the supply picture was the basic relationship between management and labor.

The war crisis forced a quick acceptance of certain conditions in the labor-management controversy as it existed prior to the war.

Then, labor unions were pushing for closed shop agreements, with the strategy of asking this maximum in the hope of extending their organization and gaining strength. There was little hope on the part of union leadership that they could achieve industry-wide bargaining status — that they could expect industry to guarantee their membership status through the "maintenance of membership" device.

Still, these have been direct outgrowths of the war. The maintenance of membership practice was labor's price for the "no-strike" pledge during the war.

As a direct result of the war relationship between management and labor, unions now have a controlling power over material supply. Through industry-wide bargaining practices, labor can either make industrial materials and services available — or withhold them.

This power implies a degree of responsibility which unions have not accepted — and two courses are now indicated. The first is some reduction in the powers wielded by unions through direct curbs on their organizations. The second is the requirement that unions assume the responsibility which are inherent in their new powers.

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SAVES TIME AND MONEY ON PACKING PAINT

"Since we discontinued our old method of packing and installed Acme Silverstitching, results have been more than gratifying. We can stitch 100 cartons now in the same time it took to glue 50. Moreover, we've realized savings in labor and material of almost 30%!"

USE THE CLOSURE COMBINATION THAT

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SilverStitch BOX STITCHING WIRE

- Always uniform in width and gauge
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- One-piece, continuous length, 5 and 10 pound coils . . . cuts threading time
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SilverStitchers BOX STITCHING MACHINES

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Sealing Shipping Containers by Stitching is Faster, Stronger and More Economical

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if you now wrap your product in paper

A bag may do your job better at lower cost

Yes, if you now wrap your product in paper, you may be wasting valuable time, material and labor in your packaging department that could be saved if you used *special paper bags*. The Bemis Paper Bag Specialty Division is giving manufacturers important savings by developing bags and methods of packing a wide range of products formerly hand-wrapped in paper.

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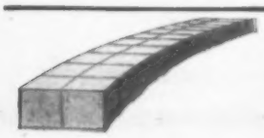
A waterproof paper bag saves time, materials and labor in wrapping trees. Trees ready for shipment are usually wrapped in paper. Now they may be slipped into special paper bags supplied by Bemis. Time and labor is saved, and the bag makes a better looking package.

4′ x 12′ sheets of wallboard are usually wrapped in heavy paper. A large paper bag has been designed to hold six sheets. This gives savings in labor and materials; frees valuable floor space in the packing department.



100-pound cubes of firebrick clay are unwieldy and hard to wrap in paper. A special paper bag speeds up handling and provides a more efficient protective covering.

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No matter what type or size of product you make, if you now hand-wrap in paper you may find new packaging economy in a *special paper bag*. Call Bemis today. There is no obligation.

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You can't go wrong on size and weight.

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A number of these features are pointed out above. They give you the means of doing the job as *well* as it can be done —as easily, as rapidly, as economically as it can be done. This combination of features means extra value that is yours only in WeldELLS and other Taylor Forge fittings for pipe welding. Insist on the fittings that *"have everything"* . . . it pays!

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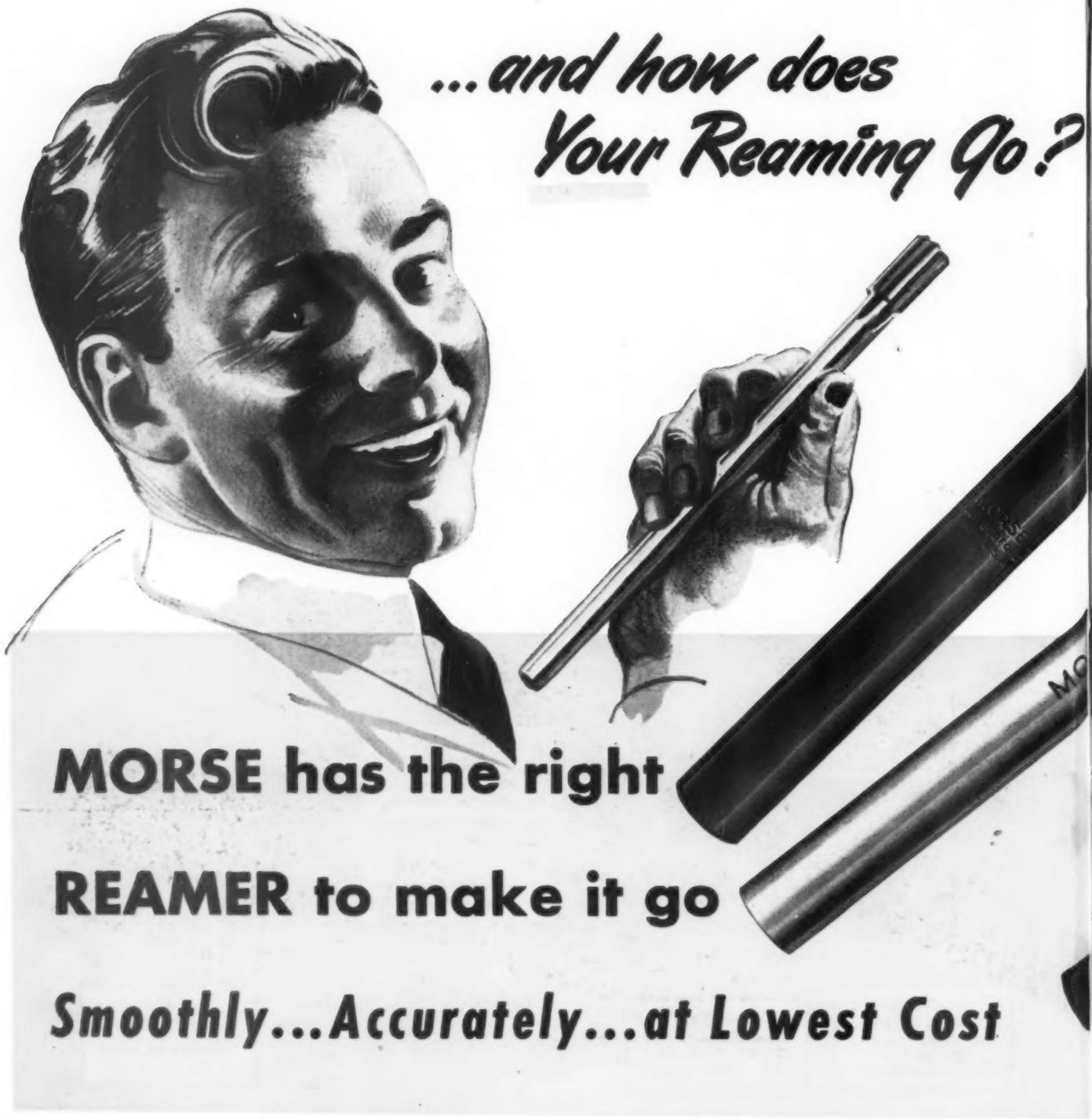

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Smoothly...Accurately...at Lowest Cost

YOU'LL NEVER BE LEFT IN A HOLE... if you use Morse Reamers on every reaming job you have. In whatever type you need, Morse Reamers will do the job to your tolerances... smoothly... quickly... and keep on doing it time after time, far longer than your usual expectations.

For Morse Reamers are made to last... and last... and last. Like all Morse Tools, they are made to deliver the greatest number of cuts under proper working conditions... that is, when adequate metal is left in the hole to enable the Morse Reamer to perform *as it is designed to perform.*

All types of standard Morse Reamers... and special reamers, too... are available through your Industrial Supply Distributor. A few of these types of Reamers are shown on the facing page. In addition, Morse makes drills, cutters, taps, dies, and special tools which, like Morse Reamers, *will never leave you in the hole.* Ask your Industrial Supply Distributor to get you the Morse recommendation that will give you top reamer performance on *your* particular job.

No. 1653 Spiral Fluted Chucking Reamers: Straight shank or Morse Taper Shank. For use in stainless, chrome, nickel or molybdenum steel. Extra long life.

No. 1655 Fluted Chucking Reamers: For removing small amounts of metal to enlarge drilled holes and finishing them true and to size.

No. 1733 Expanding Chucking Reamers: When worn slightly below size, expand them slightly and regrind . . . and regrind . . . and regrind. One of these reamers does the work of many solid reamers.

No. 1701 Structural Reamer Spiral Flutes: Designed for use by Structural Workers, Boiler Makers, Bridge and Ship Builders. Made for severe and rough work, for reaming rivet and bolt holes in structural iron and steel work in buildings, bridges and ships as well as boiler plates. They are not ground close to size.

No. 1666 Stub Screw Machine Reamers: Furnished in decimal sizes where close tolerances are observed. For use in automatic machines where short tools are required.

No. 1627 Shell Reamers with Spiral Flutes: Have taper holes, diameter being specified at the large end.

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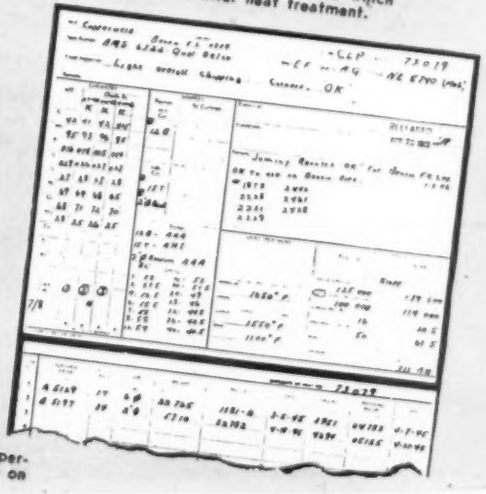

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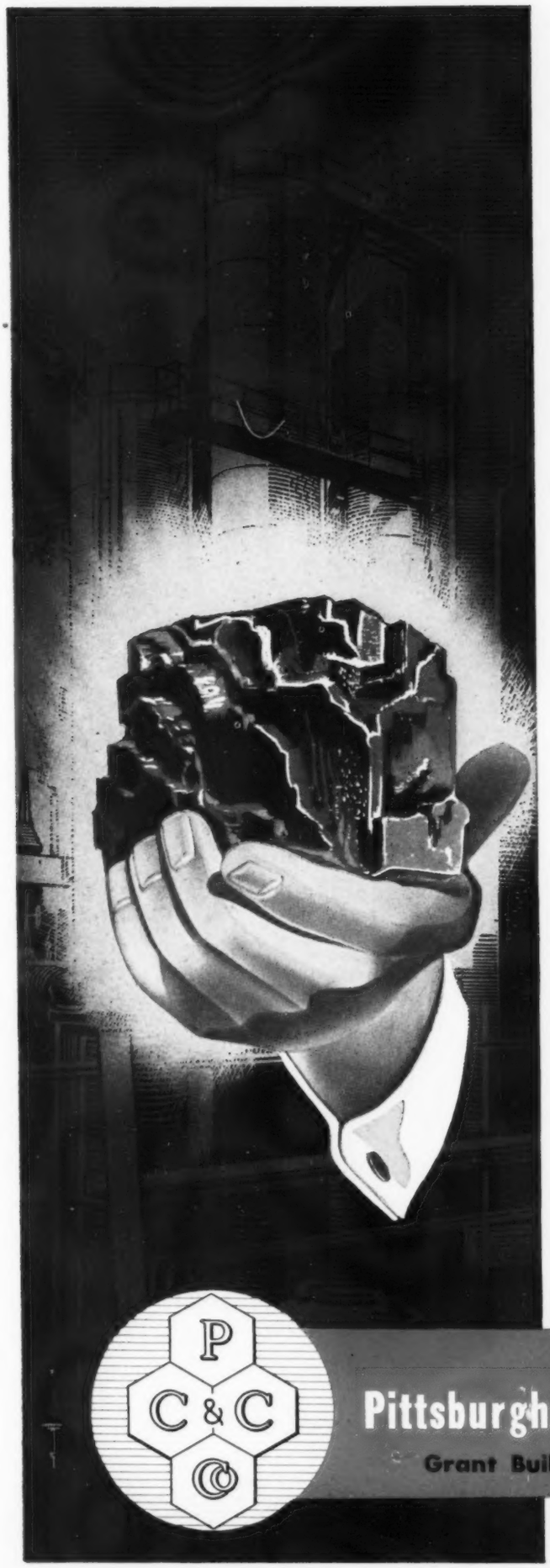

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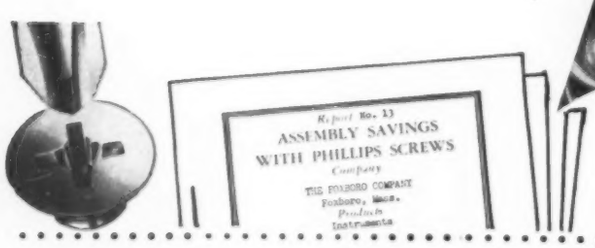

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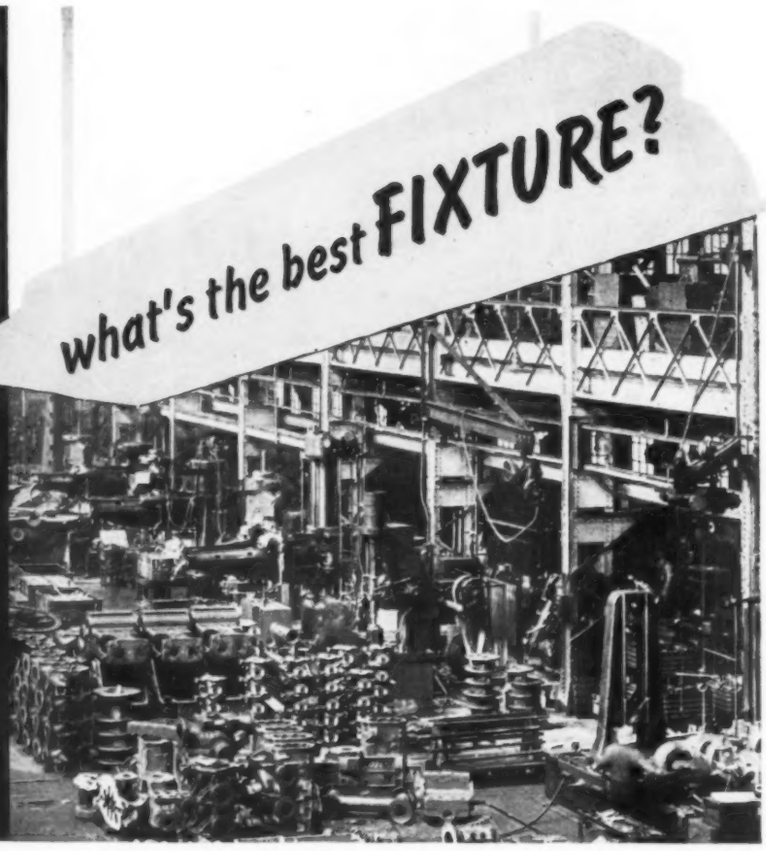

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The National Magazine of Industrial Procurement

FEBRUARY, 1947

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PURCHASING is an independent journal not the official organ of any association. It is the only publication of national scope devoted exclusively to the interests and problems of the purchasing executive in industry and government. Established 1915 as "The Purchasing Agent." Consolidated with "The Executive Purchaser."

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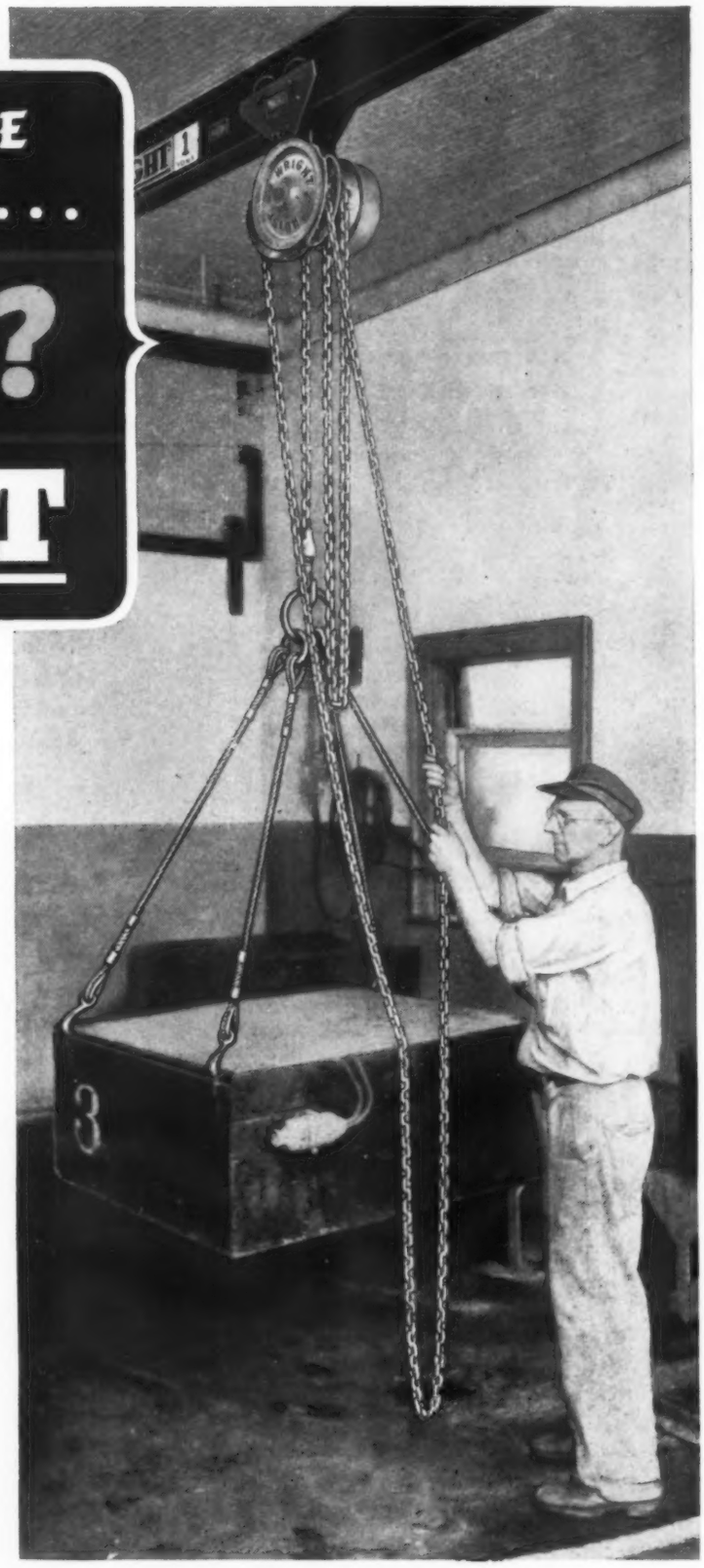

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INDUSTRIAL PURCHASING POWER

THE second major point of President Truman's address to Congress on the state of the Nation called attention to the continuing concentration of economic power through the growth of big business. This is a situation that entails important social and economic responsibilities, whether or not you take the view that it is cause for alarm. Obviously it is *prima facie* evidence of the characteristic American genius for organization and mass production, which is largely responsible for our economic strength, industrial leadership, and material prosperity.

One point to be noted in this development is that it means a tremendous growth in the practice and influence of centralized purchasing. For centralized purchasing is intimately identified with large scale operations and specialized functional organization.

The last complete industrial census—prewar—showed approximately 12,000 companies in which purchasing authority was centralized. Reliable estimates now place this figure at close to 17,000 companies. This is partly due to growth which has raised many hitherto small enterprises into the higher bracket, and partly to the adoption of centralized purchasing in operations of lesser volume as the soundness, benefits and economies of such organization for procurement are more widely recognized.

In the prewar picture, purchasing agents in the less than 10% of companies where centralized purchasing departments were maintained accounted for approximately 67% of the nation's total industrial purchases—a concentrated and highly significant buying group. If President Truman's figures for 1947 are accurate, the corresponding group today represents more than 80% of industrial buying power.

Purchasing agents *are* the industrial market.

Stuart F. Heinritz

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HIGHLIGHTS

A brief summary of outstanding features of timely interest and importance in this issue, to conserve the time of busy readers

A complete **Purchasing Department Manual** is reproduced in this issue, as recently compiled and put into use in a representative manufacturing company. Emphasis is being placed today on the importance of putting policies and standard practice instructions into specific written form as a means toward effective operation and administration. Here is a practical example of how one company has done the job. It will serve as a useful guide to other purchasing organizations undertaking a similar project. See page 108.

The **Pilot Plant** has long been recognized in production management as the best way of finding solutions to manufacturing problems before they get to the production line and make serious trouble. Now that same technique is being successfully applied to problems of purchasing. On page 90, E. L. Cady reports some significant examples of this trend.

Products are of little value without adequate packaging to get them to market, and **Container Purchases** have been a major source of concern in many procurement programs after the obvious questions of materials and supplies have been answered. E. E. Rumple, on page 120, discusses containers and how to select them—an article that every buyer will find timely, interesting and helpful.

Sales executives are giving much thought to the coming **Buyers' Market.** This was the theme of a significant conference at Boston last month, where more than 1000 sales managers agreed on the necessity of getting back to fundamentals in selling and building distribution programs from the consumer point of view. Excerpts from several key addresses are reported on page 95, and the buyer's viewpoint is detailed in another conference address on the following pages.

Management Expects its purchasing men to accept their responsibility as an integral part of the company's policy making councils and as a major contributing factor to profitable operation. In L. S. Kimball's article on page 101, a top management executive puts this into the practical terms of one company's policy, with a report of how it works.

This month's **Guest Editorial** (page 87) comes from the Canadian Vice President of the National Association of Purchasing Agents—Garnet Dickson of Toronto. The business and industrial leaders of the Dominion share with United States industry the deep conviction that free enterprise is the key to continuing prosperity.

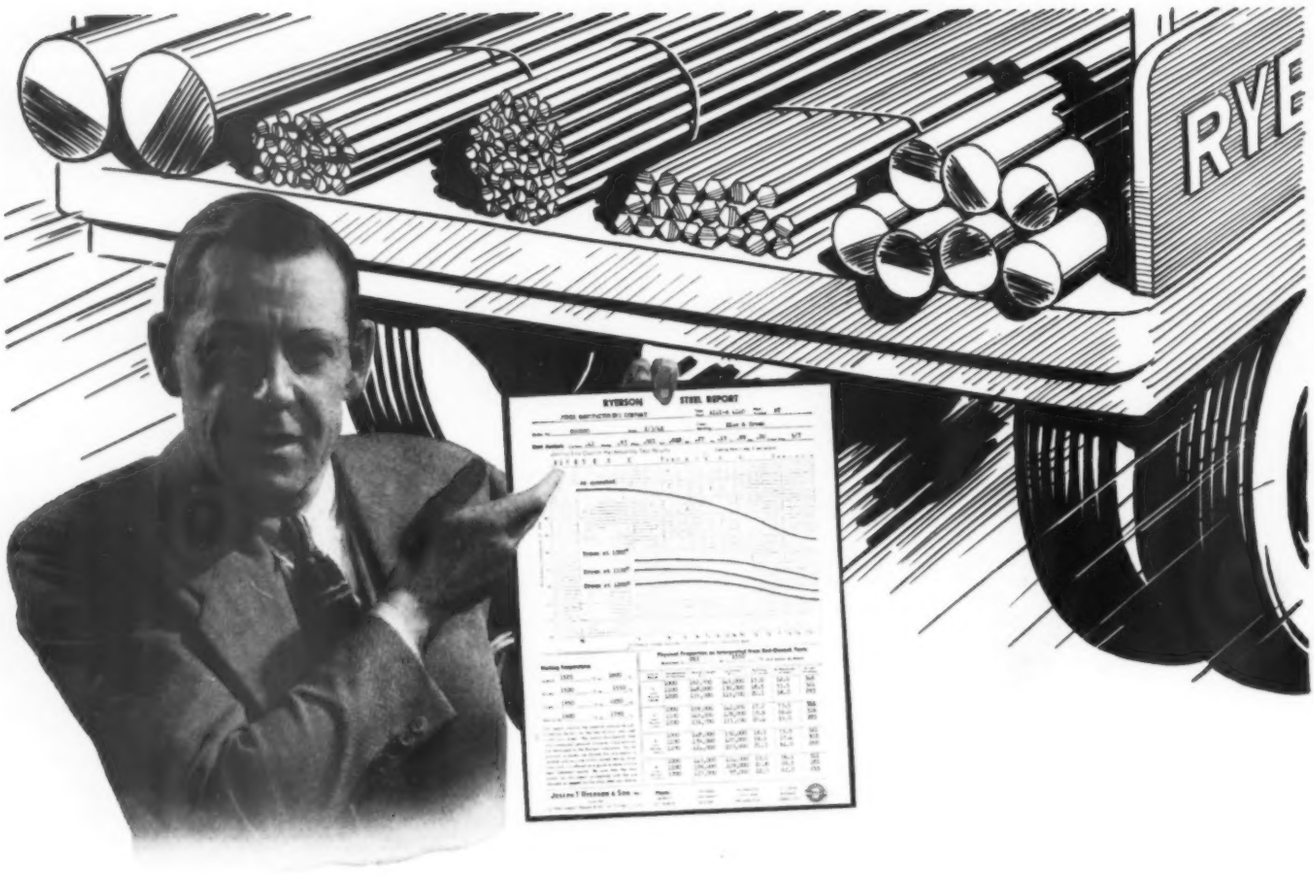
In these busy times, it is a common complaint of business men that they have no **Time to Read,** and that many of their adventures in current reading have proved disappointing. Yet it is true more than ever before that the progressive and well informed executive must keep abreast of modern thought. The answer lies in greater selectivity. On page 138, Grey Leslie presents the observations of a discriminating reader on the technical and economic fare offered by publishers, and reviews some of the books he has found stimulating, challenging and informative.

Which way are prices going? And how reliable are the statistical indicators that guide the business man in his interpretation of trends? Our Washington editor, on page 116, tells how one of the leading **Price Indexes** is compiled and what it tells about the course of prices on the threefold level of raw materials, wholesale costs, and the consumer's cost of living.

E. P. Scully, whose recent article on job evaluation in purchasing aroused wide interest and prompted an unprecedented volume of editorial correspondence, follows through with a second article on the theme that performance must be **Measured by Results.** Turn to page 88.

Should the purchasing department control **Expediting?** Most buyers think it should. Sixteen reasons for this opinion are listed on page 128.

Don't overlook these monthly departmental features compiled especially for purchasing men—the **Washington Letter** on page 67 with its timely and authoritative preview of official trends on matters affecting industry, as gathered by our Washington office; the listing of **Know-How Information,** that is yours for the asking, appearing on page 14; and the illustrated summary of **New Products and Ideas** that are now available for the industrial buyer (page 148), providing a quick and convenient means of keeping up to date on recent developments.



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By Garnet T. Dickson

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Freedom! This is the dream of all men. We on this continent enjoy more of it than any other people of the industrialized world. Men the world over have fought and died for freedom, for centuries. World War I, with all its bloody sacrifices, did not annihilate the foes of freedom. We see now that it stimulated them to greater and more sinister effort. It is yet to be seen whether World War II can check this.

The Atlantic Charter sets forth the freedoms for which we all strive. How can we perpetuate them? It has been said that "The price of freedom is eternal vigilance." The stimulation which maintains free enterprise is eternal vigilance.

More than a hundred years ago it was recognized that America and Russia were to be the two greatest integrated nations of the world in this century, and would follow different and opposing courses in the development of their world influence. Today we are privileged to observe this development in full flower. We see Russia with double

Continued on page 344

Garnet T. Dickson is Purchasing Agent for The Goodyear Tire & Rubber Company of Canada, Ltd., New Toronto, Ontario. His qualities and capacity for leadership in his chosen profession have been demonstrated as an active member and officer of the Toronto Association of Purchasing Agents, and he is currently serving as Vice President of the National Association representing District No. 5, which includes the Central Ontario, Essex-Kent, Hamilton, Montreal, Toronto, and Winnipeg Associations.

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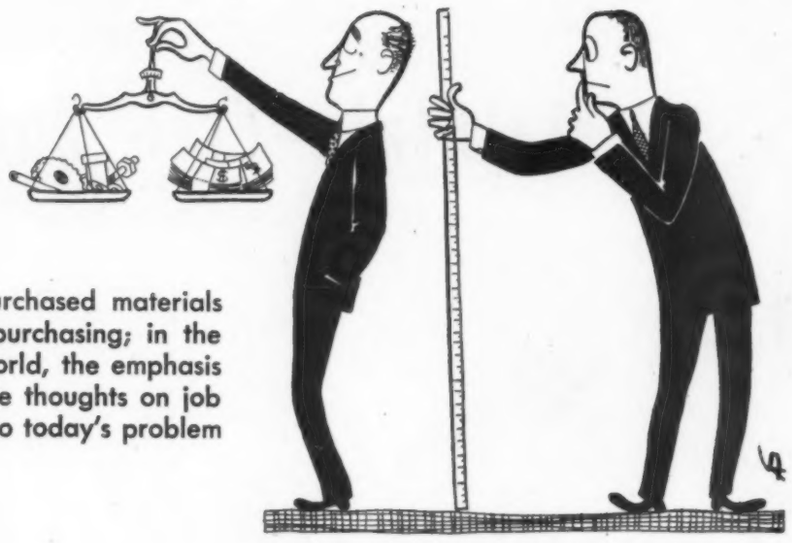


During wartime, delivery of purchased materials was the measure of effective purchasing; in the competitive postwar business world, the emphasis must be on cost. Here are some thoughts on job analysis and evaluation keyed to today's problem

• ***By E. P. Scully***
Director of Purchases
Engineering and Research Corporation
Riverdale, Maryland

LAUREL wreaths have been liberally distributed in recent years to the men and women in purchasing who contributed so much to the unequalled production records of all time. The results were there to be seen, and no one bothered too much about detail. In the period since V-J Day, however, industry as a whole has operated in a fog-bank of confusion, and is still groping for a safe and sane pattern for industrial security. The vagaries of government controls and labor relations are reflected in the indecision which throttles down our progress toward reconversion to maximum peacetime operation.

Both of these factors, of course, are crystallized in a common denominator—*price*. And price is the special interest of the purchasing department. It would appear, then, that a good deal of management's concern is in respect to the purchasing department, and once again purchasing is faced with a challenge that will tax its full capacity.

Certainly order had not emerged from industrial chaos at the turn of the year. Management, looking ahead for 1947, still had a major job of policy planning, based on uncertainty. Meanwhile, the purchasing department was called upon for its annual report. Presumably that report summarized departmental activities and accomplishments. But to what extent did the tenor and construction of the report contribute to management decisions and the whole industrial pattern for the year ahead? Again, details are unimportant. The number of orders you place, or the cost of operation, are inconsequential compared with your stake in the projected plans of the management.

Remember, purchasing gained full stature during the late war for its splendid performance in getting materials at the *right time*, and management needed no linear measure to appraise the results. Now our task is to get material at the *right price*, and if our performance in meeting this responsibility is comparable, there won't be any more need for a yardstick than there was during the war years.

Basically, management must know the cost and availability of material, and their own labor rate, before they can determine the sales program or profit potential. The labor cost is probably a matter of contract record, but material costs cannot be reposed in one contract, nor in any one place —unless it be in the purchasing department. Here, then, is the challenge and the opportunity for purchasing to make a distinct contribution toward the return of a normal economy in the Nation. How you seize the opportunity and meet the challenge will determine the yardstick that management will apply to the purchasing job.

The Eternal Triangle

The question of a yardstick for measuring the efficiency of the purchasing department has been a stickler ever since the Dutch bought Manhattan Island from the Indians for a handful of beads in one of the classic purchase transactions of all time. I don't think that a yardstick has ever been found big enough to measure the efficiency of that purchase, and I'm sure it will take just as much longer to find any single measurement of purchasing in our present industrial scheme.

The reasons for this are apparent, if not obvious. First of all, purchasing generally buys what some one else specifies. Secondly, purchasing operates in fluctuating markets, and is not always free to buy according to the tides. Thirdly, management decisions may not coincide with desirable market conditions respecting the materials to be bought. These three factors constitute a triangle within which purchasing must operate, and it may prove a bit awkward to try to cover that triangle with a single yardstick, especially in view of the fact that the size of the triangle will vary with almost every single purchasing department.

Probably there should be a way to project the accomplishments of the purchasing department, but it will have to be taken more objectively. If the production department were to report on the efficiency of their department, it would certainly deal with the number of pieces produced per man-hour at an average labor rate, with so much lost machine-time —all tangible factors easily translatable by mathematical formulae. That is the type of information and report management would want from pro-

duction, for the simple reason that efficiency of production is an element of cost to be combined with materials cost and overhead in order to determine selling prices and profit possibilities. What management really gets in such a report is a summary of *results*, which likewise determine the shop potential for the ensuing period.

I believe that this is essentially what management also wants from purchasing. If such is the case, maybe we should trade in the yardstick for three 12-inch rulers and use them to measure:

1. Results.
2. Efficiency of operation.
3. Forecast and recommendations on materials and departmental operation.

If the development of this outline is logical, it seems clear that there can be no yardstick other than the *results* obtained, and your own preceding report for comparison. And if this is to be the pattern of your report, it is obvious that it will lose much significance unless it is shaped to the triangle discussed above.

The Basic Figures

Assuming that we will report on the three phases enumerated above, there remains only the detail of compiling the facts and figures. Taking our outline in reverse order, we can safely assume that the forecast is a normal function of the purchasing department, although reservation should be made to provide for periodic revisions.

The second phase of our outline —efficiency of operation—may require a little more analysis. We immediately think of the Comptroller's figures on our "living expenses" and salaries, to which we add the number of requisitions, orders, and deliveries handled, the dollar volume, unit cost, and similar statistics. Since this is all a matter of figures and records, it looks pretty sound. But is it, really? And does it prove anything? Hardly, unless the figures are given their roots *in the triangle* in order to establish a definite relationship with (a) source and method of requisitioning, (b) market conditions, and (c) management plans and decisions. These three factors offer a platform on which to "set up" your departmental figures, and from which they will extract a greater significance.

Since this phase of our report outline deals only with efficiency of *operation*, we must consider it merely as a preface to the report on the efficiency and results of our big job —the purpose for which our department basically exists—which is *purchasing*. The results or accomplishments obtained by any purchasing department will vary according to the degree of authority or responsibility placed in it. Here again we are stymied if we try to apply any standard yardstick. How, then, are we to project, measure, and report the *results* of the purchasing operation?

In a recent issue of PURCHASING (September, 1946) a "Job Analysis Work Sheet" was illustrated, in which the duties and responsibilities of a Buyer in a purchasing department were listed and evaluated. If the description of the job approximates the duties and responsibilities of your own Buyers, why not call it a "Purchasing Department Analysis Work Sheet"? Such a work sheet affords you something more tangible to start with and report on, and it can be applied by the year, month, project, product, or shop release, as you prefer.

The Buyers work sheet also indicates the particular characteristics considered essential for acceptable performance, and weight factors have been assigned toward a point-total. In the same fashion you could obtain a point-total for the department, and set it up as "par" for acceptable or normal performance. Extra points would be allowed over the "par" figure for any evidence or display of the particular characteristic beyond the mere "acceptable" on any purchasing project, and by so increasing the rating you are projecting the accomplishment. Once the standard or "par" is set up for the department, you can measure any major buying activity or buying period against it. At the end of any given project or period you have a box score, and the box score always tells the *results*.

If you really want to have the results recorded and reported in a manner that has some basis in fact and in basic significance, I am sure you can adapt this evaluation method to your own operation. In any event, tie your report in with the operations and plans of the organization as closely as possible, in order to insure full and proper interpretation of your story.

EDITOR'S NOTE

This article is a logical sequel to Mr. Scully's discussion of "Job Evaluation in Purchasing" in the September 1946 issue. It presents the author's interpretation and answers to many of the questions prompted by the previous article. Judging by the extraordinary response to the earlier discussion, it will be of unusual interest to many readers.

Mr. Scully is an able and practical purchasing man. He is exceedingly cooperative—witness his consistent and constructive activity in the local Association at Washington, D. C., his unselfish and untiring service on the N.A.P.A. Executive and Educational Committees, his frequent and always stimulating service as a speaker at conferences and forum groups of purchasing men, and at purchasing courses throughout the East, bringing his bag of samples and crusading as the advocate and exemplar of practical know-how in buying.

He is also a very busy man. Following publication of the earlier article, his mail brought more than a hundred and fifty letters of inquiry, asking for further information and assistance on the subject, all of which were conscientiously answered in due course. Recollecting that experience, he suggests: "Will you please add a note to the effect that it is rumored I have gone to Africa for 12 months, as it is quite a job to keep up with the questions and correspondence that come out of one brief article in PURCHASING."

To relieve this situation, the Editor suggests that any questions arising from the present article be addressed to this office, where they can be collated and forwarded to the author, with the idea that an inclusive reply may be incorporated in a subsequent article that can serve as one answer for all.

PILOT PLANTS AND MODERN PURCHASING

Accelerated weathering unit for pilot plant development of plastics products at Rohm & Haas.

Making use of pilot plant procedure for better products and procurement

Scientific production tests replace the old method of experimental lots

● *By E. L. Cady*

THE purchasing agent of a ball bearing manufacturing company recently accepted a sample of a new aluminum alloy. This piece of bar stock proved to have good machining qualities, low coefficient of friction, and good ability to work with the lubricities of the lubricants commonly used in thrust bearings and to act as a bearing metal. With its light weight, which would impose very little burden on the balls, it was an ideal metal for use in the ball spacers of thrust bearings.

Naturally, the design and sales departments were enthusiastic about it. And so were the customers to whom sample bearings made with it were submitted.

And then came the awakening. The salesman who submitted this sample had neglected to state that it was the product of a pilot plant operation, that there was no certain proof that metal of equal qualities would be produced on a production line operation with ordinary workmen instead of pilot plant technicians handling the processes, and that it never would be made on a production basis unless orders for large tonnages were in sight.

No such orders were obtainable. The purchasing agent then had to explain that his plant had unknowingly taken a cooperative part in a pilot plant operation of the aluminum maker. The sales manager in turn could go and sing "Hearts and Flowers" to his customers.

Problem in Plastics

In quite an opposite case the purchasing agent of a plastic products fabricating company had a new product which required closely controlled stiffness, resiliency, chemical resistance and heat resistance in the plastic material. Exact color matching would be important too.

For the raw materials maker and the fabricating company alike this was frankly a pilot plant job. In the one plant the materials had to be piloted, and in the other their fabrication.

The materials maker began with laboratory samples. From these were worked out the specifications of chemicals and other materials which he would have to buy from his own suppliers. Small production lots of these were purchased, making sure that they represented average production lots of their supplies and were not special in any way. And

with them the pilot plant operation began.

As is quite common, the exact color matching proved to be a problem. Color would vary in hue, chroma, value, or all three, with every variation in the raw materials. And as commercially produced those chemicals were sure to vary within commercial limits.

It would be necessary to make up good sized production batches and hold the color even throughout each batch. And with each new batch the fabricator would have to begin a new lot number on his own production line. This called for market research by the fabricator to see how much of the end product he could sell and therefore how big the production lots ought to be.

Pilot plant runs of the material were submitted by the plastics maker. With chemicals and heat resistance held to satisfactory figures these runs could vary in stiffness and resiliency. Stiffness and resiliency, of course, seldom are found together. Stiffness is the ability of a material to resist deformation, and resiliency is the ability to recover original shape after being bent or otherwise deformed and to do this recovering at a given speed and with a given force. Stiff materials usually are brittle rather than resilient, and resilient materials tend to be elastic rather than stiff.

Lots having various ratios and increments of stiffness and resiliency were submitted. The fabricator found that the more resilient materials tended to spring or back away from the cutting tools and were more costly to fabricate. Therefore new and more desirable specifications for resiliency were set up.

The material would be wanted in tube, bar and sheet forms. As the fabricator ran various lots down his own pilot plant line he found that the spoilage was likely to be highest on the tubing and lowest on the sheets.

Instructions were given to the materials maker, then, to work toward slight overshipments of the tube form, undershipments of the sheet, and normal or median lots of the rod. This permitted each production lot of material to be so balanced that the fabricator would have in inventory the least amount of "ends" which had come from various lots and so would not completely match each other in color.

In his laboratory and pilot plant operations the materials maker worked out the inspecting and testing methods which would assure a satisfactory product. These were checked over by the pilot plant men of the fabricator, and changes were suggested. The final purchase contract included a specification of the test and inspection methods of the materials maker.

When actual production of larger lots of the materials began, it became apparent that still further improvements in the material might be made. To take full advantage of these the fabricator would have to step up the operating speeds of some of his machines. And changes would have to be made in the test and inspection procedures at some of the fabricating steps.

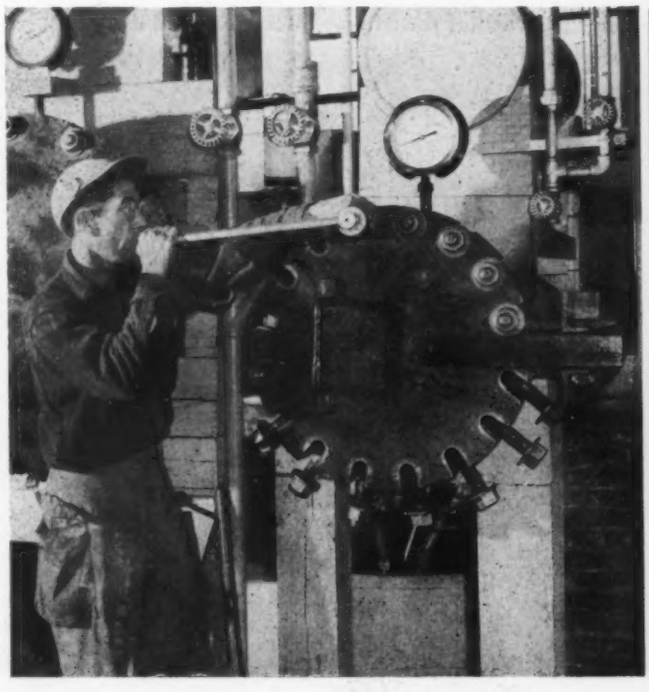
A Dual Project

The situation then developed into a bilateral one. In one phase of this, the materials maker was making production lots of materials at a profit and the fabricator was fabricating them at a profit. In the other, the two pilot plants were working much as if the first sale had yet to be made. And the purchasing agents of both companies were placing separate orders for the two phases.

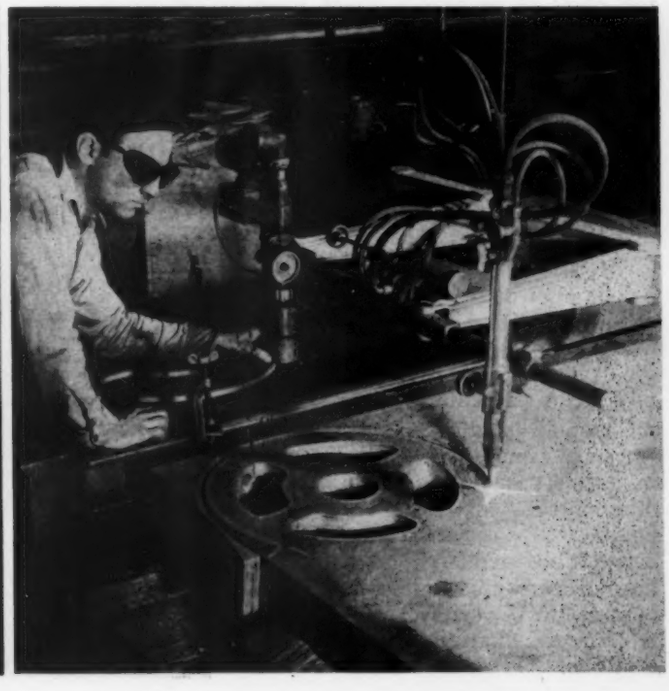
From the very start of this operation, nearly all of the material fabricated on the pilot plant line was saleable merchandise. Some lots were enough off standard so they had to be routed to retailers who would sell only small quantities. But the cost of the pilot plant operation was nearly, and perhaps fully, repaid out of profits on goods produced on that line.

At no time was the competitive purchasing position lost by the fabricating company. It sometimes is profitable to set up an exclusive arrangement by which the supplying company receives all of the order for a product developed on its pilot line and does not sell that product to any

Pilot plant operation in the DMU treatment of wood at the S. S. Keeley & Sons plant, for working out controlled wood qualities.



Flame cutting of gear blanks is often a pilot plant operation in machine development. The teeth are machine cut, the hubs welded on.



competitor of the buying company which cooperated with its own pilot line, the arrangement to last for a specific time period such as two years. But in this case other material makers were free to route their materials down the fabricator's pilot line and to compete openly for the production line volume.

Pilot Lots vs. Samples

The difference between these pilot plant operations and the old time "experimental lot basis" should be emphasized.

Experimental lots usually were produced in laboratories or by other "isolated technique" procedures. The making of a laboratory sample gave the technicians a chance to try out all sorts of theories, even though they had little relation to what could be done on his production line. And since the buyer usually tested the samples on a laboratory basis, his technicians also were likely to apply their pet ideas to the new material.

The relationships of experimental lots to what could be expected of the production lines of either buyer or seller, then, were random. Actual production lots could require a great deal of readjustment of production machines, of high cost trial and error along production lines. Often the time of supervisors and of machines for this could not be afforded. The trial of an experimental lot might have to wait for a slack season. The net result was that it often took two years or more for an improved material or technique to find its way into an end product. And the costs of getting it there were high. But it should be mentioned in passing that the exchange of laboratory samples and the discussion of experiments and techniques between the laboratory men of buyers and sellers still is an excellent short cut to abrupt improvements in products and processes.

Using A Pilot Plant

The pilot plant, by contrast, is an actual production line. It is a proving ground, but even more, a tool for developing and rehearsing actual production procedures.

The pilot plant may be an isolated "capsule plant", as often is the case in chemical factories, bakeries and other process industries. It then will be equipped with a small unit of every kind used on the production line. None of this equipment will be of the "toy" variety. All will be truly representative of the production line.

The capsule plant can do everything but work out general averages. And the process industry is likely to be highly dependent upon the experience that in large batches general averages will work out, that shipments of scrap and of other raw materials from various sources will vary but can be so mixed and so proportioned that a controlled quality end product will result. Steel mills, paper mills, practically every industry that uses scrap as a raw material uses this controlled average method. The capsule plant rarely processes large enough batches to arrive at these averages. But skilled and experienced men almost always can predict from pilot plant tests what the averages will be. And in the transition from pilot plant to full scale production line, the trial and error adjustments of material quantities and of machines made necessary by the averages obtained, very seldom present much of a problem.

Pilot plant operation is not limited to companies large enough to afford capsule plants. Some of the best pilot plants are in the hands of small companies, use only one or two miniature machines, do everything else on the smaller pieces of actual production equipment. This is especially true of machine shops, welderies, fabric processing plants, foundries.

The problem of transition to full production still obtains. A hand poured casting does not tell the full story of what will happen when machine molding and sand slingers are used. But it does point the way.

The purchasing agent of a maker of fragile items was not satisfied with the effectiveness and the cost of the company's packaging of its products. Tests of experimental packagings had been made, but progress toward improvement was slow. A single sample package, or even a few of them, "proved" too little about what the package would do under actual production conditions.

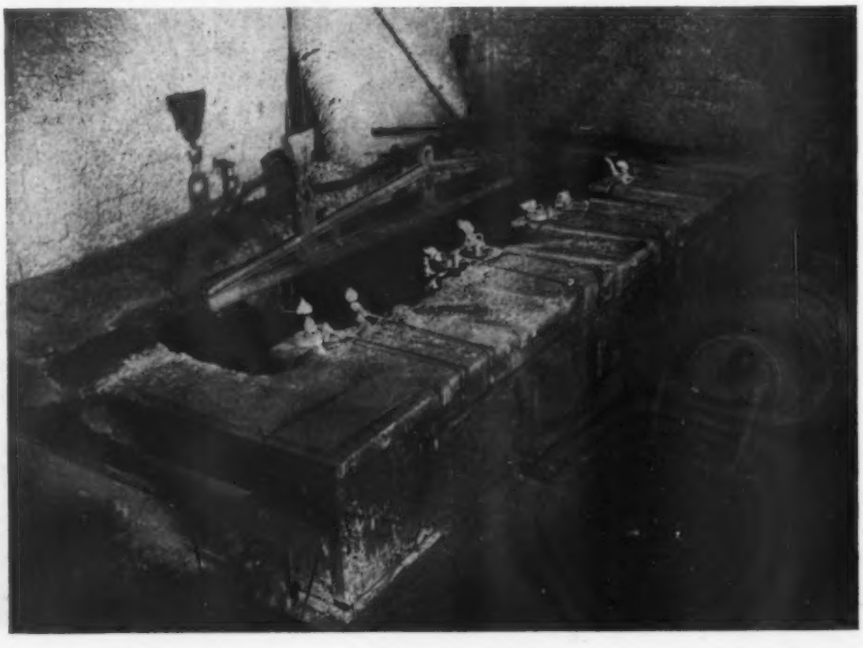
Problem in Packaging

A packaging pilot plant was set up along one wall of the shipping room. All that was needed was a conveyor belt for the items to be packaged and the usual bins and tables for the packaging materials. The female operators would bring their chairs from their regular working positions when they worked on this line. The pilot line would function only when new devices and materials were to be tested. Filled packages would be specially marked but would go through the sealing machines of the regular production line.

Arrangements were made with a carton maker in a city which was a fair trucking distance away. Trailer loads of fully packaged and cartoned materials would be routed to this plant. The carton maker would remove a few cartons from the trailer and would x-ray them to find out whether or not the contents had shifted or had been damaged.

If damage had occurred, then the trailer load would be taken back to the purchasing agent's plant, and no trouble with customers would be set up. But if there had been no dam-

Sodium hydride descaling bath is used 90% of the time on production operations. As a pilot plant it has solved many descaling problems.



age, then the remainder of the trailer load would be routed on to customers in the vicinity of the carton plant.

The cartons which had been x-rayed would be put on standard drop testing, vibration testing and other machines. They would be x-rayed at frequent intervals, and at the first sign of shifting of the contents within a package or of a package within a carton the test would cease, exact notation of the damage and of its causes would be made, and the truck would return the carton at its next "empty" return trip from that point.

Important Information

In this way the purchasing agent had a constant check of the procurement costs of packaging materials, the labor and the machine time of assembling and closing packages made of various materials and of various packaging element designs, and the exact amounts of mishandling which various kinds could be expected to withstand. There was very little breakage of finished products in shipment. And because there was nothing haphazard about the selecting of packages to test, only one or two trailer loads had to be returned from the carton making plant where the testing was done.

When the design development had reached a satisfactory point the final test was made. Company salesmen were instructed to go into large and small retail stores, and without giving any instruction of any kind, observe the unpackaging of the goods. Great damage could be caused here. And it would be a rare retailer who would either follow instructions or fail to make a claim against the company if he used improper methods.

This led to further modifications of the packaging. The company looks forward to other changes when the buyers' market arrives and more merchandising is designed into the packaging. But the pilot line method for quick but sure developing is ready. And as of today the packaging cost is down 20%, the shipping weight is down 10%, and the effectiveness of the packaging as a means of safe protection of the products is at a highly satisfactory point..

A buyer of welded products was not satisfied with prices and qualities. Welderies blamed his company's designs. Arrangements were made with a weldery by which the company engineers went there and worked on their product designs. New designs were sent down the pilot plant line of the weldery. Work could be stopped on them at any point where it became apparent that the welding sequence would entail costly repositioning of the pieces, that stress relieving would be unduly costly or might result in high rejection losses, or that a better design for welding could be developed.

The purchase contract in this case covered the engineering cost to the weldery for training the company engineers in this specialty, a specific per hour cost for the use of the pilot plant facilities, an agreement to pay for the raw materials at cost, and an agreement that the finished satisfactory products belonged to the purchasing company.

With its products redesigned for welding the company was free to buy them upon competitive bidding by all the welderies on its acceptance list. Quotations were very much lower than they had been before this change was made.

Significance to Purchasing

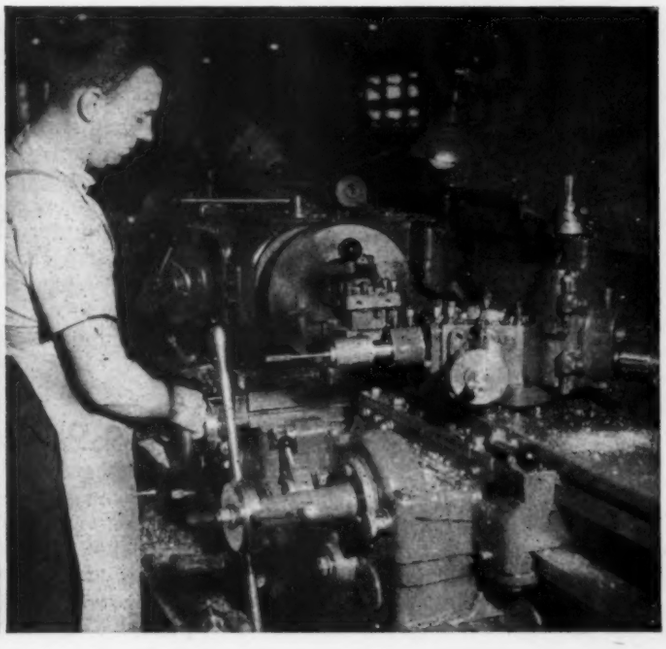
Pilot plant operations, then, can involve unusual purchasing problems. A pilot plant operation can mean the use of a single capsule plant which the company keeps in one corner of the research laboratory, or it can mean the use of facilities of suppliers, of customers, and of every department of the company's plant.

Some pilot plants are used almost wholly for the testing of raw materials. The materials may be experimental lots of kinds which never have been tried on the company production line, or a regular procedure of pilot plant testing of all large shipments of materials may be followed.

One purchasing agent described his pilot plant as "the parachute from the ethereal regions of the research laboratory to the mundane affairs of the production line". But in any case the pilot plant is a practical, time saving, exact production and test method, developing short cuts to the adoption of improved materials and production procedures. As such it will have a place of increasing importance in the purchasing picture

Lathe beds are developed in pilot plants, tried out on long production runs, brought back for testing.

Products to be fabricated by almost every known process are piloted on the turret lathe.



SALES MANAGERS PLAN FOR THE BUYERS' MARKET

Excerpts from leading addresses at the New England Sales Management Conference, Boston, January 10-11

● *The Cardinal Principle*

If we can chart our course with one cardinal principle in mind—that the interests and welfare of our customers shall be paramount in all our future planning—then we shall be moving in the right direction. Everything we can do to keep prices within reasonable bounds, to increase good will and the quality of service to our customers, must surely help to bolster our common resistance against any important business setback.

—Hon. Channing H. Cox, *President, Boston Chamber of Commerce*

● *A Second Chance*

In the combination buyers' and sellers' market during the coming year, and perhaps longer, the weight will remain largely on the sellers' side. This is fortunate for that type of seller who forgot the importance of character and good manners during the war when he had his customers at his mercy. During this transition period, a lot of sellers who really don't deserve the chance, nevertheless are going to have the chance to re-establish themselves in the good graces of their customers by showing a proper spirit of humility and cooperation in dealing with persons who need their products.

—E. M. Douglas, *Vice President, International Business Machines Company*

● *Get Rid of the Rust*

We might just as well face frankly the fact that we in management, whether we admit it or not, are rusty too! There are some changes in our markets which are as yet unmeasured, but while they are not measured in total, the individual measurements are available. Prewar plans put back into operation too often will not fit the need. Some of us may not realize what drastic changes have taken place in our own products, their ingredients or materials, their performance.

It's a harder job to take the rustiness out of your own operation than it is to bring a rusty salesman back to top performance. What we need is an honest admission to ourselves that while the wheels are turning and business is picking up speed, there is sometimes an unpleasant grinding in our own gears.

—J. H. Rasmussen, *Vice President, United Wallpaper, Inc.*

● *Things or Results?*

Don't sell me *things*.

Don't sell me clothes. Sell me neat appearance—style—attractiveness.

Don't sell me shoes. Sell me foot comfort and the pleasure of walking in the open air.

Don't sell me candy. Sell me happiness and the pleasure of taste.

Don't sell me furniture. Sell me a home that has comfort, cleanliness, contentment.

Don't sell me books. Sell me pleasant hours and the profits of knowledge.

Don't sell me toys. Sell me playthings to make my children happy.

Don't sell me tools. Sell me the pleasure and profit of making fine things.

Sell me ideas, and sell me the results that things can accomplish.

—Dr. Glenn N. Merry, *Professor of Marketing, New York University*

● *Quality and Price*

Don't get the impression that the American people are not interested in economy and low prices. They are. They have been. They probably always will be. But, the American people want better quality at low prices. They have acquired a habit of better things. It is not a habit they want to break. Given increased buying power during the war and since its close, they educated themselves to prefer higher quality goods and services. Today they not only take utility for granted, but they take an increasing number of yesterday's luxuries for granted.

The problem this change creates for manufacturers and merchandisers is a big one. We are being asked by our fellow citizens today to give them better products and lower prices. They want both. It is a great challange to the ingenuity of all of us, but a still greater opportunity for those of us who intend to be first in every advance.

—J. R. Davis, *Vice President, Ford Motor Company*

● *Cost of Distribution*

During the two decades between World Wars I and II, American industry's cost emphasis was directed primarily toward reducing unit manufacturing costs. To accomplish this objective industry employed motion study, methods analysis, work simplification and other mass production techniques. In cases where these techniques were unfairly or improperly applied and this work poorly done, a reaction took place. Wage costs per unit of production have increased more than 50% since 1939.

Although an increase in worker productivity is expected by many, the manufacturing side of industry will be busy for some time recouping its lost ground. Management is going to look to other areas for reduction in costs. In the transition to a buyers' market, sales executives must be prepared for a request for lower selling expense—to see if reductions in selling cost can be achieved on a sound basis—to assure that the selling job is being done as economically as possible.

—James C. Olson, *Partner, Booz-Allen & Hamilton*

HOW BUYERS BEHAVE IN A BUYERS' MARKET

In a competitive system of free enterprise the buyers' market is the normal condition

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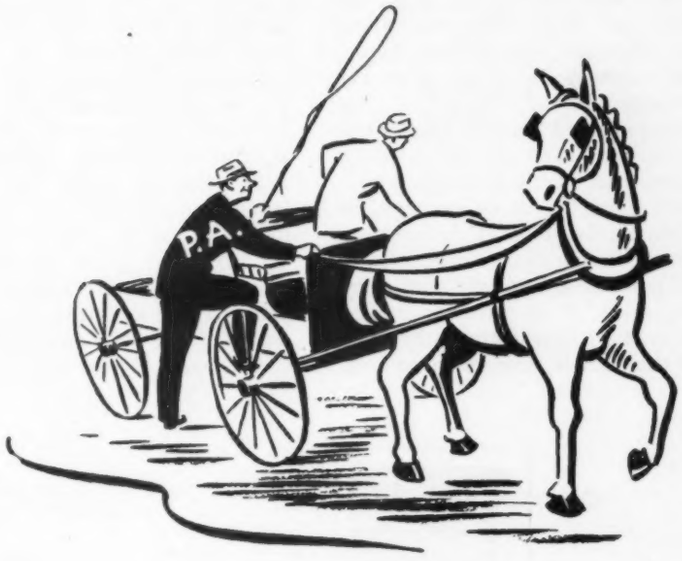
● *By Stewart F. Heinritz*



The general topic of this conference—I shall not refer to it as a problem—concerns the return to a buyers' market. I assume we are all agreed that this is the direction of today's business trend. Some will argue that we have already arrived at such a condition, and perhaps that is true for their particular business. Purchasing men, who deal in many markets, will tell you that it is impossible to generalize on the subject, that the buyers' market is already here for some materials and products and is still many months away for others. They have learned from long experience that the forecasters' favorite hedging word—"selective"—is probably the most accurate and the most significant word in the whole vocabulary of business economics. But they, too, will agree as to the trend.

As we view the changing economic scene against which we must all play our several parts in this next act of the business drama, we do so with differing emotions. Let me try to interpret for you how the buyer may be expected to read his lines. He has a very important part—one that is vitally important to you who share the stage. It is seldom his lot to be cast as the hero, but I can assure you that he has no ambition to be the villian of the piece. In any event, as the buyers' market approaches, he steps into the title role and the spotlight is turned upon him. Frankly, he has been awaiting this moment, and he is ready.

Back to Normalcy

A few weeks ago, I had occasion to write a well known purchasing agent in the middle west, requesting a photograph. He is a studious, mild mannered, and immensely competent buyer who has managed somehow to keep his plant running throughout the prolonged era of shortages and controls. Like most purchasing men, he has been under a severe eye-strain during all of this period—first, from peering intently into every nook and corner of the market to find the needed materials, and secondly, from poring over the fine print escalator clauses that have lately crept into his contracts. It is quite natural, therefore, that he has taken to wearing glasses, and when the photographer's flash bulb went off a brilliant high-light was reflected in each of the lenses. He sent the print to me with some apology. "The starry effect," he wrote, "is probably the gleam in my eye as I see a buyers' market approaching."

Now this gleam in the buyer's eye is not one of sardonic triumph, nor of unholy anticipation. Basically, it is a gleam of satisfaction that normal conditions are returning, under which he can again practice his profession of purchasing. For in the system of competitive enterprise, a buyers' market is the normal market. Normalcy in business implies a healthy desire to buy, the ability to pay which constitutes buying power or effective demand, a stable economy which permits a person or a company to plan a program and policy, sufficient time to assemble and weigh pertinent information and to decide on a course of action, and an element of choice as to what shall be purchased. These are exactly the factors that characterize a buyers' market, and they are the factors that have been notably absent in the business conditions of the past five years.

Back to Fundamentals

Many sales executives are lamenting the fact that real salesmanship has become a lost art during this extraordinary and unnatural period, and they are bending every effort to revitalize and indoctrinate their present sales staffs in the fundamental selling principles and techniques that proved effective in a sterner competitive day. Experienced purchasing executives are similarly lamenting the fact that scientific purchasing was also a lost art during the years when their whole responsibility was summed up in the exhortation to "get the goods"—anywhere, at any price,

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Address at the 8th annual New England Sales Management Conference, sponsored by the Boston Chamber of Commerce, Boston, January 10, 1947.

through any compromise or substitution, but get the goods.

While sales organizations were being curtailed in most companies, contracted to a bare minimum because there was neither the need nor the opportunity to sell, the numbers of industrial purchasing personnel more than tripled. Literally thousands of those who acquired the title of "buyer" during this period, and whose whole experience has been conditioned by the abnormal circumstances, never had the opportunity to know what real buying is. It was fashionable for them to complain sarcastically about priorities, but actually they leaned upon their priority rating like a crutch; it was the only technique they knew, and eventually it got the goods, if there were any goods to get. They paid lip service to the classic triple objective of the purchasing agents' creed—price, delivery, and quality; but the only part they really believed was that the greatest of these is delivery. They became experts in expediting and substitution, but not in purchasing. Meanwhile, some of the more seasoned buyers, who knew better but were forced to operate under the same compulsion, fell into some pretty sloppy habits.

Of course purchasing departments have now reverted to more nearly normal size, and a pretty thorough job of screening has taken place. Yet it is small wonder that the slogan in purchasing circles for the past two years has been: "Back to Fundamentals!"

This winter, in the city of Philadelphia, sixty earnest purchasing executives—each one the head of his department, and with an average purchasing experience of more than fifteen years per man—have gone back to school. It is a school of their own devising—of, by, and for purchasing men. In a carefully planned course covering the major phases of the purchasing responsibility, and extending over a three months period, they are meeting around a table and beating their way back together to the basic principles of sound and scientific procurement. And each week, a hundred and twenty of their key assistants are meeting in four evening study groups under the combined leadership of practical purchasing men and expert instructors recruited from the local universities, to master the fundamentals of their jobs. That situation is paralleled on a smaller scale, but with no less enthusiasm, in dozens of industrial centers throughout the country where organized purchasing groups exist, in one of the most amazing educational projects ever sponsored and put into action by any business or professional association.

The Purchasing Function

So the first answer to the question of how buyers will behave in the coming buyers' market is that they are determined to behave like buyers—like men who have an important job to do, and who know their job. The eminent Director of Purchases of one of our largest manufacturing corporations, who served his business apprenticeship in the sales division of the company and got his first lessons in purchasing from the other side of the desk, recently remarked that the principal difference between buying and selling is that selling is a little sportier assignment. When the salesman goes out to sell, he doesn't expect always to sell every prospect or to make a sale on every call; he hopes to compile a good average and to make his share of sales. But when the buyer goes out to buy for his company's requirements, he always has to buy; there can be no blanks in his record. There's going to be a lot of buying in the buyers' market ahead. And these buyers are not going to be content with merely getting deliveries more easily than in the past. They are really going to buy. That's what purchasing agents are for.

Specifically, what does this mean, and how can you adjust sales policies to meet the new conditions?

The Right Material

First, before any buying is done, buyers will try to determine and to find the one best material or product to satisfy their need. This may involve some rather radical departures from the old familiar ways of building a product, even though the old ways again become available. It may involve new or different materials, different methods of fabrication, different operating requirements in the buyer's own plant processes. If there is one thing that buyers learned from the prolonged period of enforced substitution, above all others, it is that there's more than one way to skin a cat, and that sometimes the new way is better than the old. The old way may still be best, but it will have to prove its claim.

The tremendous advances in scientific and technological development, with fifty years of technical progress crammed into the short space of the past five years, have greatly emphasized this viewpoint. Buyers are keenly aware of the splendid contributions made by research in your companies toward better materials and methods. They

respect the spirit of research and appreciate its fruits. But they are realists enough to recognize that the greater part of industrial research is undertaken in the interest of a particular product, whereas their own research problem must be faced from exactly the opposite direction, starting with the purpose to be accomplished. In finding the answer to that problem, buyers must consider not only the competition between suppliers, but the more fundamental competition between materials and methods available for achieving the desired result. And frequently that answer may indicate the use of not only a different material, but a combination of two or more materials when the special properties of each can be combined to reach a better end product or result.

Bear in mind these two types of research; just as materials are constantly seeking improvements in quality, new applications and wider markets, so industrial requirements are constantly seeking better and more economical means of fulfillment. It is when these two objectives meet on some common ground that purchases and sales are made, and mutually satisfactory business relationships are established.

Performance—the Acid Test

Consequently you may expect the buyer to listen attentively to the story of your product and what it will do—and to weigh it against all other known possibilities of accomplishing a similar purpose. They will be most receptive, and most responsive, to a sales presentation made in terms of product performance, for these are the terms into which all other factors must eventually be translated in coming to a buying decision. Just how strong this trend has already become may be judged by the significant fact that the leading national engineering societies are even now in the process of revising technical specifications and test methods from the established basis of structural and chemical analysis to this practical basis of performance standards and tests. Remember that a specification is essentially a purchasing definition of the material or product. As such, it is something that must command the attention and respect—and the manufacturing and sales policies—of the potential supplier.

Important as this is—and it can scarcely be overemphasized as one of the major changes in buying policy and practice for the period ahead—too much reliance should not not be placed on quality and performance specifications alone, from the technical viewpoint, as the determining factor in buying decisions. For while they are doubtless the fundamental consideration, they are modified by other considerations of a commercial and economic nature that are strictly within the buyer's sphere of responsibility, the conclusions drawn from the broad field of non-technical but thoroughly scientific purchasing research.

This field has not yet, to my knowledge, been accurately defined, though many phases and specific cases of purchasing research have been described, with a record of very substantial benefits derived from such activities. For the most part, these projects depend on the keenness, initiative, and resourcefulness of individual buyers. They do not always dignify the process by the term "research"; it is simply a part of the buying job when that responsibility is taken seriously and done thoroughly. To the extent that buyers are determined to do a better job and a real job of buying, you can expect this research attitude to become much more prevalent in the market of the future.

Teamwork Is Needed

In its simplest terms, this means that a product definition may be unassailable from the technical point of view, and yet be inexpedient to the extent that quite a different decision may be made in the actual purchase. I do not for a moment imply that purchasing can, or should, or will, usurp the prerogatives of any other department in determining what shall be bought. It is becoming very clear, however, and many instances could be cited to illustrate the point, that such decisions are more and more becoming a matter of composite judgment in which all points of view will receive full consideration, and some will necessarily be compromised in the interests of the greatest benefit to the company as a whole. Heretofore, the purchasing viewpoint has often had but a feeble voice in such deliberations, and has been subordinated to the others, but an important change is now taking place.

By force of circumstances during the wartime sellers' market, and by force of tradition in the prewar days, many buyers were not in a position to make their voice an effective one on controversial issues where departmental interests were in conflict. But as the result of wartime experience and wartime accomplishment, the buyer has definitely become a member of the management team, with the respect and confidence of his colleagues and of top management. It will be well for the supplier to have the purchasing man on his side. In the coming buyers' market you may expect buyers to be far more aggressive than ever in the past, in pressing the claims of the purchasing factors in respect to any proposed transaction.

Proving a Point

In one successful manufacturing organization not very far from here, the Director of Purchases has on several occasions gone so far as to procure trial lots of parts made to his own specification when his judgment has been overruled, along with the production runs of that part made to the specifications which he challenged. In the test of actual comparative performance and economy, his judgment has not always been sustained, but it has been sustained often enough and dramatically enough to justify the practice. A few hundred dollars is not an excessive price, he says, to prove a point, or even to prove it wrong; over the spread of rather an extensive purchasing program, those test expenditures have been repaid many many times over.

That is not a representative case. In most companies, such issues are thrashed out in conference; there are established facilities and channels for research and testing, to which the buyer has access in common with other departments, for developing information or proving a point; there are prescribed regulations governing the initiation of purchases, whether for test or for use, and accounting procedures tend to curb and discourage any such individualistic approaches to the solution of a problem. From the organizational standpoint, it is probably better to have such an orderly method. The buyer, as a good team player, ought to observe the stated procedure and abide by the decisions that are arrived at in due course when all parties at interest have had the opportunity to present their respective viewpoints and recommendations. The important point, however, is that the buyer has been invited to the council table and that he will be both articulate and influential in the deliberations there.

The buyer will be aggressive, too,

in maintaining his outside contacts, his policy of going out into the market in his search for materials, and his intimate first-hand knowledge of suppliers' plants, facilities and methods. Only the other day, I read a prediction that the buyers' market would see the buyer putting away the overnight bag that for five years stood ready-packed beside his desk for instant use, that henceforth he would stay at his desk and let the seller come to him.

My own observation does not support that view. It is true that the wartime "scatteration" of purchasing offices and purchasing authority is being corrected, and that the position of the central purchasing office in its control over procurement policies is being greatly strengthened, but that is merely a continuation of the history of centralized purchasing—a movement that has been steadily growing in acceptance and practice over the past twenty-five years, and is gaining in momentum. The active search, keeping closely in touch with markets and sources, has been too valuable a buying technique to be lightly discarded, and the desk-bound purchasing agent will be even more rare a species now that he has the opportunity to organize his work at home so that he can systematically carry out a program of field investigation.

Within the past year or two, several of our largest manufacturing corporations have turned to some form of regional or divisional purchasing organization, decentralized operations under strong centralized control, for the very purpose of maintaining these field contacts And my personal experience has been that I meet more of my buying friends on planes and trains today, following up some promising lead for better materials and better sources, than was the case at the height of the hectic wartime emergency.

The Question of Price

You may be very sure that buyers will be decidedly cost-conscious in the buyers' market. This doesn't mean merely that they will be price-conscious, though that is a part of it. No honest buyer ever disclaimed having a keen interest in the price he pays for merchandise; if he did so, he would not long be a buyer, for management expects him, among other things, to be a conscientious and watchful sentry at the gate where from 30% to 60% of the company's total manufacturing expenditures are made, and the buyer's own professional code places on him the responsibility to get maximum value for every dollar of expenditure. It doesn't mean, either, that the lowest price will always get the order. One of the very clear lessons of purchasing research is that the lowest ultimate costs do not necessarily result from the lowest unit purchase prices. The science of purchasing seeks lowest ultimate cost, and is more concerned with determining and securing the *right* price for the purchased goods that go into that ultimate cost figure than in whittling down a unit price for its own sake.

There is a pretty general feeling among purchasing agents that they haven't been getting the right price on all of the things they are buying, and they are going to be particularly alert on this point for some time to come—at least until there is an indication that prices have arrived at a state of reasonable stability, and that they have found their true level. Also bear in mind that this coming buyers' market represents the first opportunity that purchasing agents have had in several years to give any serious and effective attention to price negotiation. Up to this point, nobody was interested in discussing the subject with them, there were price controls to settle the question in any case, and the great majority of adjustments were necessarily on the upward scale. Now that the matter is at least open for discussion once more, there is a very human possibility that the pendulum of price emphasis may temporarily swing too far in the opposite direction, but the price level itself will be determined by economic factors and by negotiation.

This cost-consciousness, however, is not fundamentally—nor even primarily—a matter of opportunism. First of all, it is a readjustment or return to normal and sound buying considerations after a prolonged period of unbalanced emphasis.

When production departments bring some requirement to the attention of purchasing and underline the urgency of their request with the mystic initials "PDQ", they intend to convey the meaning that such materials or equipment or supplies are needed "Pretty damn' quick". In other words, it is a continuation of the wartime philosophy that delivery is the one all-important factor of the procurement. But in the vocabulary of purchasing, these symbols have quite a different significance—a reference to the classic trilogy of buying factors already mentioned: PDQ, Price, Delivery, and Quality. No purchase is a good purchase unless all three of these factors have been fully considered to arrive at a well balanced decision.

Secondly, this cost-consciousness reflects an identical attitude on the part of top management. Every

buyer's company is also a seller of its own products, and as a seller that company is operating under the same squeeze of rising and competitive selling prices that constitute the sales managers' problem. In meeting this situation, the buyer is responsible for that very substantial portion of cost represented by the expenditure for purchased materials and supplies. It will run somewhere between 30% and 60% of the total "manufacturing dollar"; according to the most reliable estimates, the overall average for all manufacturing industry is well above 50%. So, despite our very proper concern over rising costs of labor and the generally higher costs of business living, the greatest single factor of expense, frequently greater than all other factors combined, is to be found right here in the cost of materials and equipment bought through the purchasing department.

Costs Must Be Right

If a company is to retain or enhance its competitive position in its industry, and is to safeguard its profit position, management very logically lays upon its purchasing departments a strict injunction to see that these costs are right, and are held to the minimum consistent with the quality and service required. May I suggest in passing that instead of bemoaning this situation, the most effective course of action for a supplier is to make sure that his own purchase costs, upon which his own price must be predicated in large part, are held to these same standards.

The third reason why cost-consciousness will be an important characteristic of buying habits in this buyers' market is really a corollory to the previous ones. It is the new executive concept of the buying function, both on the part of management and among buyers themselves. The executive approach to the job implies a responsibility for profitable operation, and the particular phase of that responsibility coming within the jurisdiction ot tne buying executive is the cost of purchased materials.

Forward Buying

There are several specific aspects of buying that are due to change in the period ahead. As we are gradually changing over from sellers' market conditions to buyers' market conditions, these changes are already in process. During the years of shortages and deferred deliveries, forward buying was the rule. It was frequently carried to excess by placing orders with different sources of supply for quantities considerably greater than actual requirements—the familiar and troublesome phenomenon of pyramided or phantom demand. Many conscientious buyers who condemned that practice in principle felt that they were forced into doing it to assure their companies of a continuing supply of the things they needed, and some of them lost considerable sleep over the possibility that all of their orders might be filled. It has been a headache for sales managers too. Obviously this is one condition and one practice that must be corrected.

A leading purchasing executive has been quoted recently to the effect that there's no excuse for forward buying of anything today. Most purchasing agents would take issue with such a sweeping generalization, for there are still plenty of items that you can't pick off the dealer's shelf, though the situation has improved greatly in recent months and is getting better all the time. As a matter of fact, economists and comptrollers and merchandise managers are beginning to get a little bit alarmed when they read inventory statistics. Forward buying is certainly becoming very selective, and the trend is in the other direction. The smart buyers have been very busy squeezing the water out of their inflated commitments, and sales managers today can scan their backlog orders with reasonable confidence that they mean what they say.

Sharing Responsibility

Along with this trend, buyers are getting out from under some of the responsibilities which they had to assume in the sellers' market, and are shifting those responsibilities to the seller. Perhaps that is where they belong. At least, they should be more equitably shared than in the recent past.

For example, the buyer used to consider himself lucky if he could accumulate a fair sized stockpile of materials. Now he expects the producer or distributor to assume that responsibility, and he is going to rate the service of his suppliers largely according to their willingness to do so.

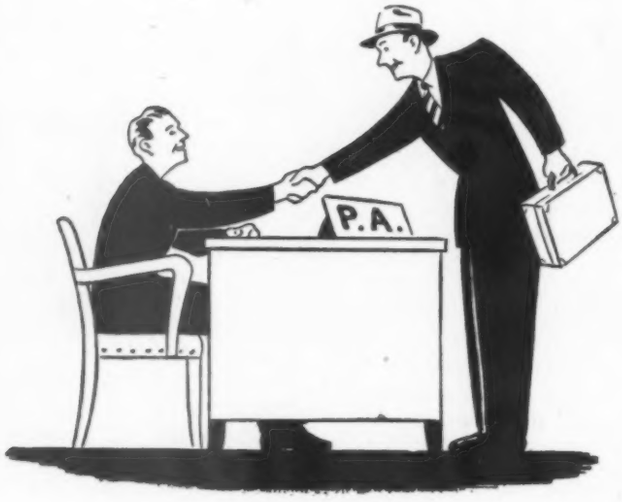
Frequently he wasn't able to maintain stocks at what used to be considered a minimum working quantity. He found the answer to that in scientific scheduling, which enabled his company to operate on much smaller materials inventories. Purchasing men are generally agreed that the benefits of precise scheduling are one of the significant lessons of their wartime experience, and that this is a permanent and constructive contribution to purchasing science. Scheduling is a wonderful thing, and I would commend it to the serious attention of every sales executive, for this is another of the responsibilities that the buyer will seek to pass along to the supplier in the days ahead.

Contract Clauses

The buyer is going to become increasingly critical of contract clauses and terms of sale that have been written into the documents of agreement, and he is going to be increasingly obstinate about signing contracts that contain conditions and terms that are not to his liking. That has already become apparent in respect to escalation and price adjustment clauses. There has been considerable talk in purchasing circles about drafting a price adjustment clause written from the buyer's viewpoint and substituting this for the sellers' clauses. Perhaps this is one reason why so many producers have recently made public announcement that the escalator clause is being dropped from their contracts for 1947. But price adjustment is only one of several items on this agenda.

The fine print that appears on the reverse side of so many contract forms—and purchase orders—presents a problem on which a cooperative program of simplification is long overdue, and this may be the time for sales and purchasing men to get together and clear up the complicated mess. The most sweeping and far-sighted proposal so far presented is a single all-inclusive clause to the effect that the seller shall assume all responsibilities customarily accruing to a seller under sales law and commercial usage, and that the buyer shall assume all responsibilities customarily accruing to him as the party of the second part. So long as the legal department has final authority in drafting and approving contract forms, I have little hope for such a simple solution. But surely a company should be willing to buy under the same terms and conditions it imposes in selling, and to sell on conditions which would be acceptable to its own purchasing department. If sales managers and purchasing agents within each company would get together on such a project and work out a mutually acceptable form, a constructive start would be made.

I have already intimated that the buyer will be more selective in respect to sources as well as in respect to materials. This should be a heartening word, for it means that the personal element in business relationships has not been entirely supplanted by the slide rule. The elements of integrity, reliability, progressiveness, cooperation, facilities, and above all the willingness and earnest effort to give service, will weigh heavily in favor of the supplier who has these qualities to offer. There is a great opportunity for real salesmanship in establishing a company as a desirable source of supply. The buyer will be responsive to that sort of selling, for he has spent a good deal of effort in recent years to establish his company as a desirable customer. Of course, such claims must be backed up with performance, in terms of the requirements and objectives already enumerated; mere promises and rhetoric will be accepted only at their true worth.



Blacklists and Reciprocity

A good deal has been said about the possibility of retaliation for real or fancied lack of service in the past. The assumption is that whenever a new figure ascends to the driver's seat, his first desire is to wield the whip. Personally, I do not look for much of this sort of thing, though I believe that the records of good will and cooperation during the difficult war years will pay off handsomely in firm and friendly commercial relations against the threat of more intensive competitive tactics. The basic problem is distribution, which consists of both buying and selling, the two complementary aspects of every business transaction. There can be no buying without satisfactory sources of supply, any more than there can be selling without customers. Any sound and permanent relationship must be worked out together. The job is just too big and too important to permit petty resentments and grudges to interfer with the conduct of business.

Blacklists are an expensive luxury for a buyer to indulge in, for they restrict competition and narrow the field of potential sources of supply. But since business is still carried on through the medium of personal contacts and relationships, it is safe to say that every buyer, officially or unofficially, has his white list of preferred suppliers.

There should of course be some mention here of reciprocity as a buying factor, but the answer to this question must come from the sales executive, not from the buyer. In the competitive struggle for sales outlets, reciprocity has already made its appearance in this market on rather an extensive scale. Purchasing men are realists, and they operate within the pattern set by company policies; consequently buyers accept the fact of reciprocal dealings, but they resent the practice nevertheless. Reciprocity is the very antithesis of science and informed judgment in purchasing, and it is the weakest of all sales arguments, however effective it may be in landing the order in any given case. Reciprocity will be a factor in the buyers' market exactly to the extent that sales policies and sales pressure make it. That includes the policy and pressure of both the supplier's sales department and the sales department of the buyer's own company. Of the two, the internal pressure is usually the more persistent. Again, this is a matter which can best be solved within the family.

Adjusting Sales Policies

To summarize, we are now on the threshold of a keenly competitive market, but one in which the volume of industrial and business activity will be high and a great deal of buying will be done. That buying will be characterized by selectivity both as to the products bought and the sources from which they will be bought. The buyer has a wide latitude of choice as to both of these factors, including a lot of new product developments, new production capacity, and new suppliers seeking his business; he also has a lot of new requirements on his own shopping list. Within the limits of the suppliers' ability and willingness to do business, the buyer will have a greater voice in setting the terms on which business will be done.

That is not an economists' definition of a buyers' market, but it describes the situation that all of us face, in terms of practical business considerations. In our system of competitive free enterprise, it describes a normal business condition. It is of course open to the possibility of abuse, but business men generally —including the buyers—have enough foresight and common sense to see that the opportunities for mutually profitable dealings must not be choked off if we are to build and maintain a sound business economy and avoid another disastrous swing into the trough of depression.

To adapt selling policies to these conditions, so as to get your share of this potentially great market, the first and fundamental principle is to put yourself in the buyer's position and work together with him on the common problem of providing satisfactory and economical products and smooth, reliable and economical distribution. Help the buyer to get maximum performance and value in the things he buys. Present your product in terms of what it will do, how it will serve his needs, and how it will contribute to lowest ultimate cost. Be ready to accept your proper responsibilities in the sales relationship. And if you will make it a point to go a little more than half way in the matter of service, your share of this great potential market will be a little bigger.

WHAT SYLVANIA EXPECTS OF ITS PURCHASING MEN

In this organization, purchasing is recognized as one of the key functions in profitable operation

By L. S. Kimball
Vice President, Operations

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Subsidiary of Sylvania Electric Products, Inc.
Buffalo, N. Y.

BEFORE the Purchasing Agent can hope to assume the stature that he deserves in any organization, it is essential that both he and the top management of his organization have a clear understanding of just what is expected of the Purchasing Department. I believe that in our organization we have arrived at such an understanding, and from the results that we are securing, we feel that much has been gained because of this.

For a period of seventeen years, prior to going into manufacturing activities in 1942, I was engaged in sales work and as such, necessarily had considerable contact with the members of the purchasing profession. I can assure you that in management of a manufacturing organization more selling work is required than is many times required in exclusive sales organizations; so perhaps the training that the purchasing group gave me has been a distinct aid to me in manufacturing.

At the outset, let me make it clear that I believe that the function of Purchasing is truly a professional one if properly applied. It is and will continue to be one of the most important functions of a modern corporation. In our Lighting Fixture Division, material costs represent approximately 52% of the sales price of our products. As General Manager of that Division, I had nine Department Heads reporting to me, each with their respective staffs. All of these Departments are required in order to produce our monthly production; and yet *one* of these Departments—Purchasing—is responsible for buying our raw materials, which represent 52% of our monthly billings.

We are now considering opening another plant in New Hampshire, and in this activity raw material costs are indicated to be nearer 65% of billings. Of course in many manufacturing operations raw material costs are nowhere near so high a percentage of billings, but I want you to appreciate why in my Division I can so easily recognize the importance of Purchasing.

A Purchasing Agent can be merely a placement agent, taking the requisitions as they are fed to him by the Production Control Department or whatever Department in his organization performs this work. If this is his evaluation of his function in Modern Management I can state without reservation that regardless of how good a placement job he may do and how economically he may operate, he will fall far short of what Modern Management wants and expects from him.

It might be well at this point, to discuss briefly our company organization in order that you may visualize how our Purchasing Department can and does function. Sylvania has adopted the decentralized plan of organization — similar in many respects to the General Motors organization plan. Our President, Don Mitchell, has a relatively small staff reporting to him at our New York offices. This staff performs functional coordinating services for the several Divisions and wholly owned subsidiary Corporations. These men perform the specialized functions assigned them by the President—Finance, Engineering, Industrial Relations, Industrial Engineering, etc. If the President could as an individual perform all these functions himself, as is the case in many small organizations, he would have no need of a staff—he'd be IT. These men have no line authority over the Operating Group but are rather coordinators, advisors, and formulators of general corporate policy.

The Operating Group includes the General Managers of the respective Divisions, reporting directly to the President. Each of these Divisions

For five years prior to taking his present position with Colonial Radio Corporation last month, Mr. Kimball was General Manager of Sylvania's Lighting Fixture Division at Ipswich, Mass. In that capacity, he recently addressed the New England Purchasing Agents Association on his company's purchasing policy and organization. The present article is based on his remarks on that occasion.

are virtually autonomous units—entities unto themselves, performing all the functions of a separate corporation. This method of decentralized organization is, we believe, the most flexible and will permit of the greatest expansion with the maximum efficiency, for with each additional new Division we have only one additional man — the General Manager of the Division—reporting to the President, and that man is held wholly responsible for the operation of that Division. This type of organization permits the maximum delegation of responsibility and permits the exercise of individuality without inflicting overburdening historic precedents on the General Manager and in turn on his Operating Staff.

I have gone to some length in outlining our philosphy of organization because I sincerely believe that without a well defined organization plan and a thorough understanding of that plan, no real success can be hoped for in either the corporation as a whole or in any of its component parts. We believe that this decentralized organization plan has given vitality and soundness to our Corporate growth from a 10-million-dollar business of the 1930's to a business which will probably well exceed 100 million dollars in 1947.

In our Lighting Fixture Division we are reputedly the largest manufacturer of fluorescent lighting fixtures. In our Lamp Division we are one of the three largest manufacturers of incandescent bulbs and fluorescent tubes; our Radio Tube Division is second only to RCA; our Colonial Radio Corporation is one of the largest manufacturers of receiving sets; our Electronics Division did some truly marvelous work during the War; it is continuing development work in the high frequency field and manufactures many electronic devices; we have a Chemical and Tungsten Division in which we manufacture all of our own fluorescent powders, refine tungsten ore and draw our tungsten wire. Our Wabash Lamp Corporation is the largest manufacturer of photo flash bulbs and Birdseye reflector lamps.

Now to get back closer to our subject, let's take a look at the Division Organization, with nine Department Heads, including Purchasing, reporting to the General Manager. Each Department Head has well defined responsibilities delegated to him, and here is an important point in organization: it is an easy thing to say that responsibilities are delegated, but it requires a firm underlying philosophy of operation to mean it. If your boss wants to be Purchasing Agent he has no need for you—either you're not strong enough for the job, or he hasn't an organization plan which will permit you to operate as a Purchasing Agent. In either case you had better get out. In our organization, all procurement problems belong to the Purchasing Department.

Now although each of our Department Heads has individual delegated responsibilities, we recognize that all Departments are interdependent. For example the best Purchasing Agent in the world will be a flop if the Engineering Department has engineered a product that won't sell. There's a story of the bar fly who challenged the bartender that he could recognize any mixed drink. He was successful to the point where the bartender was becoming embarrassed, so he turned about and filled a glass with plain water. The bar fly sipped it and was obviously puzzled. He sipped it again and said: "You win. I don't know what it is, but I'll tell you one thing—*It won't sell*!"

Therefore, as General Manager I made it a practice to meet with all Department Heads once a week for lunch on Friday and to carry on our discussions as far into the afternoon as is necessary. We cover all phases of our operation. We want all Department Heads to be acquainted with what makes the business "tick"—what is our profit and loss position, what operations are good or vice versa, what problems are currently bothering us—our labor relations, design problems etc., etc. We don't try to settle all these problems at these weekly meetings; we highlight them, and everyone who has anything to say has a chance to do so. And then we assign the problem to the Department (or usually the Departments) involved. It's as old as society—the "family" approach to the settlement of problems. Today it might be called the "committee method" of operation.

You may ask: Why should the Purchasing Agent sit through a discussion of labor problems, or wage administrations, or engineering, or quality? The answer is that the more he knows of what makes the business "tick" the better Purchasing Agent he'll be. He's got to be concerned with all activities of the business affecting the end product, from unit cost of raw materials to general economic trends determining when to buy and how much, when to retrench and operate out of inventories on a shoestring. The size of inventory in relation to production certainly determines turnover and the company's capital requirements. Of course the Comptroller keeps an eagle eye on this, but his action can only be *corrective* whereas the intelligent Purchasing Agent's activity can be *preventative*. An intelligent Purchasing Agent can influence the Engineering Department's choice of materials or principles of design. The Material Inspection Department wouldn't be required if all material came in as specified. Many fewer stockrooms and less warehouse space is required if the Purchasing Agent can control the flow of material properly with production requirements; so he's got to be concerned with efficient Production Control although he may not be responsible for Production Control.

Our Purchasing Department meets regularly with the Factory Superintendent representing Production, the head of Production Control, and the resident Merchandising Manager. In these meetings many of the long range as well as the current plans are discussed. In other meetings between the Merchandising Department and the Engineering Department where new models are being discussed, the Purchasing Agent is often called in to become early acquainted with our future models, which gives him an opportunity to influence the choice of materials and possibly even the design itself. Our Purchasing Agent has to be well acquainted with our production costs of components we produce ourselves in order to influence our management on decisions as to whether we should manufacture certain items or buy them from the outside.

I could go on indefinitely. In short, Modern Management wants of a Purchasing Agent an intelligent approach to Purchasing Problems with consideration to all interrelated activities. Where do you find such a broad-gauge and versatile purchasing executive? You find him among that 5% of people who think—not among the 10% who think they think—nor among the 85% who let others do their thinking for them. And when you find him, you *delegate* responsibilities to him, and you build him into the organization so that he knows what makes the business "tick".

Management is eager to have that type of man in charge of its purchasing responsibilities. The intelligent Purchasing Agent can make his job just as important as he cares to.

PURCHASING IS A TWO-WAY JOB

Centralized purchasing and stores records keep inventories adequate but at a minimum

By William Goettler ●

A successful purchasing department must encourage cooperation among the various departments within the organization and in its dealings with outside suppliers

THE job of a purchasing agent doesn't end with the calculation and comparison of figures or the cool appraisal of a salesman's story. It is also a part of the responsibility of this officer to promote harmony among the various departments and to build good will for the company in its vendor relations.

"Harmony and cooperation among departments is absolutely essential for successful functioning of centralized purchasing," says Miss Kathleen E. Cummings, Purchasing Agent for the Chicago, Aurora & Elgin Railroad Company, an electrical suburban line operating out of Chicago.

A woman might not ordinarily be expected to know about armatures, journal bearings, rail spikes, welding torches, or monkey wrenches. Until comparatively recent years, purchasing for industry and railroads has not been considered a woman's job, as a rule.

Miss Cummings however, demonstates that a qualified woman can succeed in purchasing, even when the program is concerned largely with mechanical and electrical items. She has been in the C A & E purchasing department for some twenty years, and has helped to build a system which many purchasing agents regard as a model for either large or small businesses.

Every one of the some 8,000 individual items needed for the mechanical, operational and electrical departments of the railroad are purchased through her department, and she has a personal acquaintanceship with nearly every one of those items. When she doesn't know the specifications for an article, one glance at the visible file reveals the whole purchase history of that item—the description, quantity and quality, the price, date of past purchases, and from whom purchases were made—as far back as 1929 in most cases.

Shop Contacts

Being a woman, she declares, isn't necessarily a handicap in purchasing industrial supplies. It may mean hopping over piles of scrap or dodging around greasy machines, but still she can get acquainted with materials, how they are used, and with the departments and men using them. And she makes it a point to do that.

KATHLEEN E. CUMMINGS
Purchasing Agent
Chicago Aurora & Elgin Railroad, Wheaton, Illinois

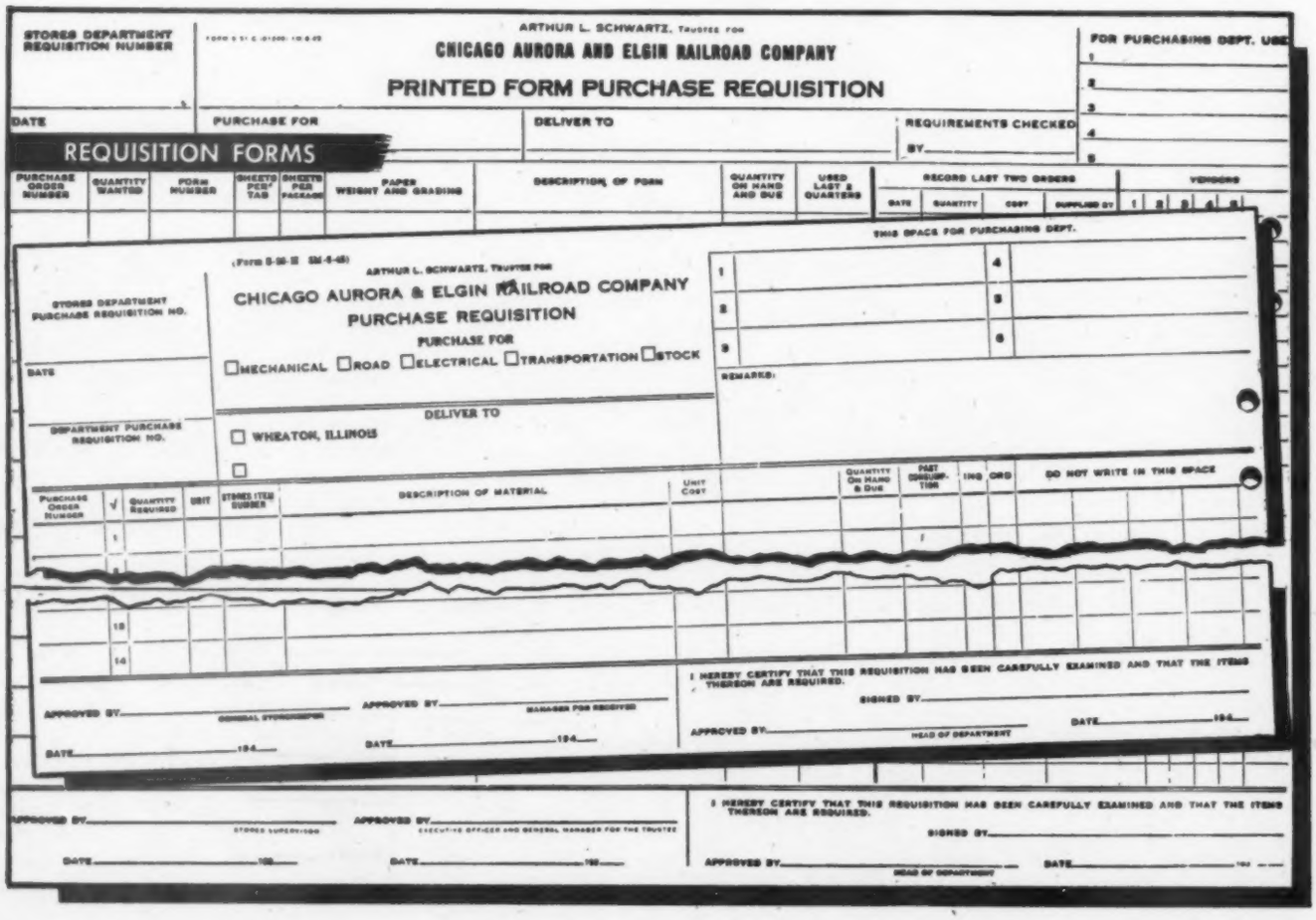
Miss Cummings promotes harmony between the purchasing department and the various operating departments by regularly visiting the shops in order to talk over with superintendents and workers the service and utility of articles purchased. They are invited to express their "gripes" about any item and a better understanding is reached as to the shop's requirements. At the same time she feels free to offer suggestions about materials and supplies, and she has won the confidence of her co-workers by this conscientious effort to provide the best possible service of supply.

"The operating departments are very cooperative and receptive," says Miss Cummings. "Nine times out of ten they will adopt suggestions made by the purchasing department."

Working Together

This spirit of cooperation is fostered by her policy in respect to contacts between salesmen and shop executives. All salesmen are required to come first to the purchasing office, and in most cases their business is transacted there. The strict observance of this policy has saved enormous amounts of time for division chiefs and shop foremen. It has been the more readily accepted because both salesmen and shop men know that in cases where Miss Cummings believes that a salesman has a new product or item that can be used to advantage, she refers the salesman to the proper individual in the interested department and facilitates the interview.

Her intimate knowledge of the company's operations and organization is exceedingly valuable in this respect, especially where an item



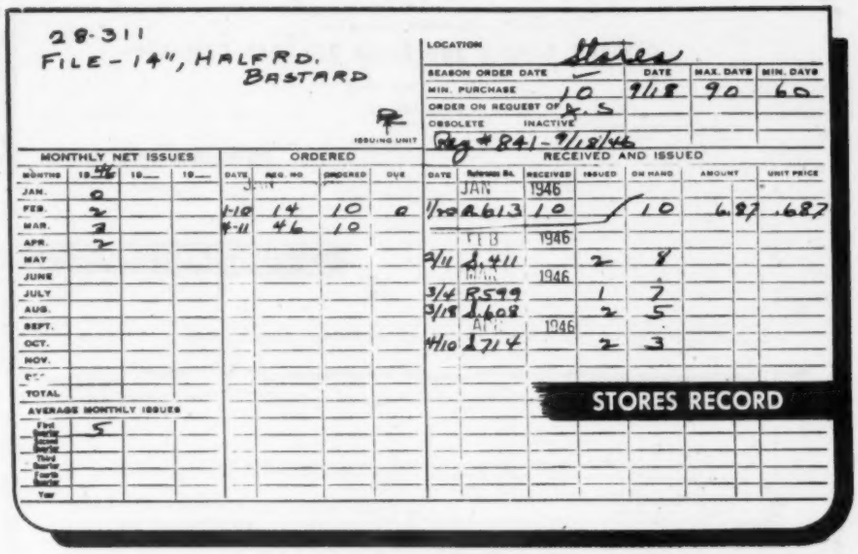
may be appropriate to only one department. By intelligent "screening" of salesmen and their offerings, she is able to direct the salesman to see the logical and authorized person for consideration of a particular proposal. Since he does not have to seek out the one special point of use, a great deal of time that would otherwise be wasted in fruitless interviews is saved for salesmen as well as for division chiefs, department heads and foremen.

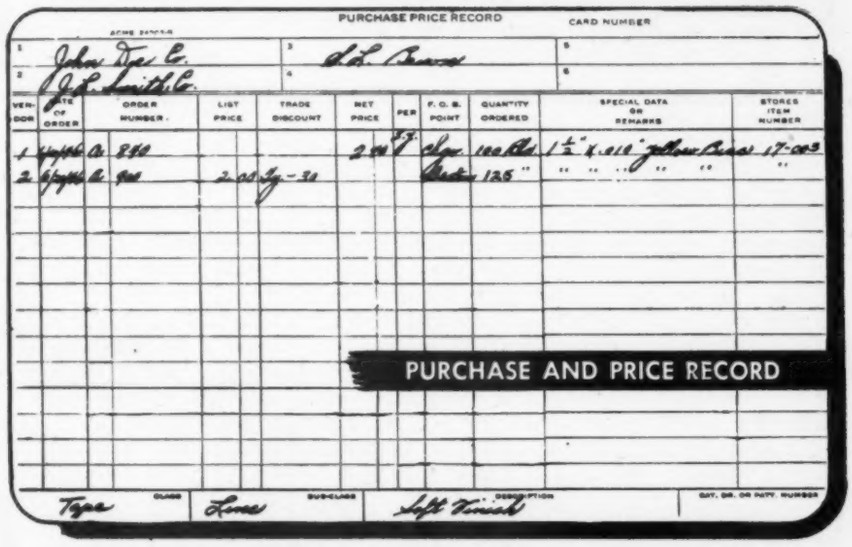
Similarly, when products are applicable to several departments of the company, this plan assures that all interested departments are apprised, resulting in a more consistent policy on materials, full benefits of any advantages that may accrue, and better purchasing through consolidation of orders which saves considerable clerical work and frequently earns lower unit prices in quantity purchases.

Interview Policies

Promoting good will for a company through cordial relations with vendors' representatives pays dividends, as many other purchasing agents have discovered during the critical period of the last few years. It means closer cooperation and better service. In the recent period of material shortages, it has frequently resulted in friendly "tip-offs" when some scarce material is available.

Miss Cummings has no set hours for seeing salesmen. They are welcome to stop in "whenever they're through town", even if it happens to





The confidence and cooperation of shop men are a big asset to successful purchasing

ARTHUR L. SCHWARTZ, TRUSTEE FOR

CHICAGO AURORA AND ELGIN RAILROAD COMPANY

108 North Main Street
WHEATON, ILL.

TELEPHONE WHEATON 1600

PURCHASE ORDER

PURCHASE ORDER

DELIVER TO

VIA:

QUANTITY	STORES ITEM NUMBER	DESCRIPTION — PLEASE SHOW STORES ITEM NUMBER ON YOUR INVOICE	PRICE

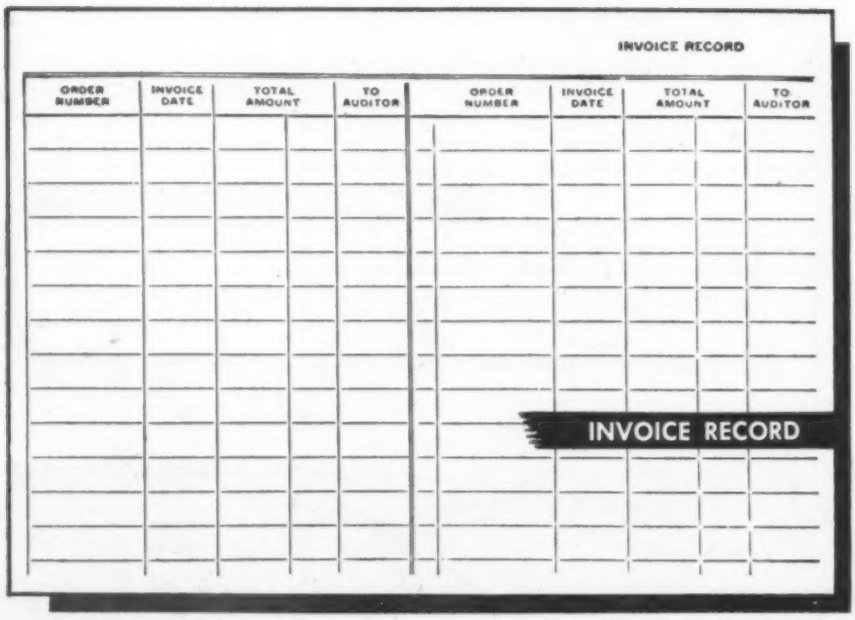
NOTE: By accepting this order, the Seller certifies to the Buyer that materials involved have been procured in accordance with rules and regulations of the War Production Board and that prices are not or will not be in excess of the legal maximums established by the Office of Price Administration.

Separate bill to be rendered for each order.
Each invoice to show order number.
Each package to be marked with order number.
Freight must be prepaid if price is f. o. b. destination.
Unless otherwise agreed upon in writing, the seller agrees, to assume the defense on any suit for infringement of patents or copyrights brought against the purchaser by reason of the use of those goods, and to indemnify the purchaser against any decree of costs in such suit.
F. O. B. FINAL DESTINATION UNLESS OTHERWISE SPECIFIED.
Prices shown include all costs, taxes, etc., unless otherwise shown.

MAIL INVOICE IN DUPLICATE
To STORES DEPT., 108 North Main St., Wheaton, Illinois
DISCOUNT FOR CASH SHOULD BE NOTED ON INVOICE.

CHICAGO AURORA AND ELGIN RAILROAD COMPANY
H. J. ZINTER, PURCHASE AND STORES OFFICER

BY_____
PURCHASING AGENT.



INVOICE RECORD

ORDER NUMBER	INVOICE DATE	TOTAL AMOUNT	TO AUDITOR	ORDER NUMBER	INVOICE DATE	TOTAL AMOUNT	TO AUDITOR

INVOICE RECORD

be just before closing time. They know that they will get full attention and consideration when telling the story of any legitimate article pertinent to the company's needs.

The simple rule of graciously greeting and listening to salesmen, even in the prewar days when goods were readily available and the supply exceeded demand, now helps the C A & E to obtain special attention in its purchases.

"Ever since the dropping of priorities, salesmen have been cooperative in keeping us supplied with critical items, so far as possible," Miss Cummings says. "When the salesman is willing to take the time for telling us about his product, it is only common courtesy and good business for us to take the time to listen."

An example of her concern with seemingly minor details that nevertheless have an influence in helping to build friendly relations between the purchasing department and its suppliers, is Miss Cummings' policy of placing a personal signature on all purchase orders. It has been suggested that a rubber stamp signature would satisfy all the legal requirements, but she prefers to retain this little additional personalized touch.

A simple yet efficient system of records keeps the purchasing department continually informed of operating department needs. The stock record cards show the store item number and give a description of the item in the upper left hand corner. Space is also provided to designate if an article is obsolete or slow moving, along with other pertinent information.

All material issued by the stores department is covered by a stores requisition. This must be signed by the foreman requesting the material, and approved by proper officials. The requisitions are then posted on the stores record cards as issues. Monthly net issues are totalled at the end of each month, and also quarterly, in order to show the average monthly consumption of each part or item during each quarter. Thus the stores clerk knows at a glance how many units of each item are on hand, and the number that are apt to be needed for the ensuing period.

In some cases, of course, a minimum number of units must be kept on hand regardless of seasonal needs. The stores department attempts in most cases to keep approximately a three months' supply of each item ready for use. Whenever the supply of an item drops to the minimum quantity, the record card is taken out for review, and purchase requisitions for the replenishment of stock are sent to the purchasing department. These requisitions are submitted to the various departments using the particular item, for approval of the quantity to be ordered.

Centralized purchasing and stores records enable the C A & E Railway to keep supply inventories at a minimum consistent with meeting operational needs. If each department maintained its own stores independently, the total inventory would necessarily be larger.

Purchasing Procedure

Upon receipt of a requisition, checks on quality and past performance are made. Then, providing there is time, the purchasing department sends out formal inquiries to manufacturers or jobbers for quotations. Wherever possible, purchases are made upon competitive bids, and orders are placed with the low bidder, considerations of quality and time of delivery being satisfactory. In the event of emergency requirements, quotations may be obtained by telephone. Even during the days

of OPA regulations and restrictions, there was sufficient latitude for competitive bids on many articles.

Various departments frequently require the same or similar items in their operations. The policy of consolidating these requirements has already been mentioned. However, certain limitations to this policy are observed. For example, an effort is made to keep orders within the space of two pages, and within certain delivery dates. This is primarily for the convenience of vendors. Under these circumstances he does not as a rule have to keep partially filled orders in his open files. Combining related items into one order also makes it possible for the vendor to send fewer invoices, and cuts down the cost of handling. For the buyer's company, it is also an advantage to have fewer invoices and simplified handling of accounts, and it is likewise easier to observe payment dates where cash discounts are involved.

For the purchase of printed forms, a special requisition form is used. It is ruled to provide space for such special information as padding or packaging, count, grade and weight of paper to be used. This eliminates a good deal of clerical work that would otherwise be necessary in a description of the printed material required if the more general form were used as in the purchase of mechanical or electrical supplies.

The requisitions are used as work sheets in the purchasing office. As indicated in the block at the upper right hand corner of the forms, alternative sources of supply are maintained for the various items, and it is the function of the purchasing department to determine the vendor from whom the goods are to be procured.

Scrap Disposal

The C A & E Railway purchasing department also handles the sale of scrap materials. Under Miss Cummings' direction, much progress has been made toward the more efficient handling of this responsibility. Formerly, scrap metal of all kinds and grades was collected and sold in one heap. Copper, brass, and steel all landed in the same pile. The bid of the junk buyer usually was accepted upon only brief "dickering". Now, workmen sort the scrap materials carefully and the various types are segregated. The purchasing department calls for competitive bids from prospective buyers. Each classification of metal is sold at different prices per ton, according to its specific value. And these values are substantially higher than when the scrap dealer made his very conservative estimate of the components in a mixed pile, and had the job of sorting them out to boot.

"We have been able to save considerable money for the company in this way," says Miss Cummings. "Even when metal again becomes plentiful, we shan't go back to the old way of disposing of scrap."

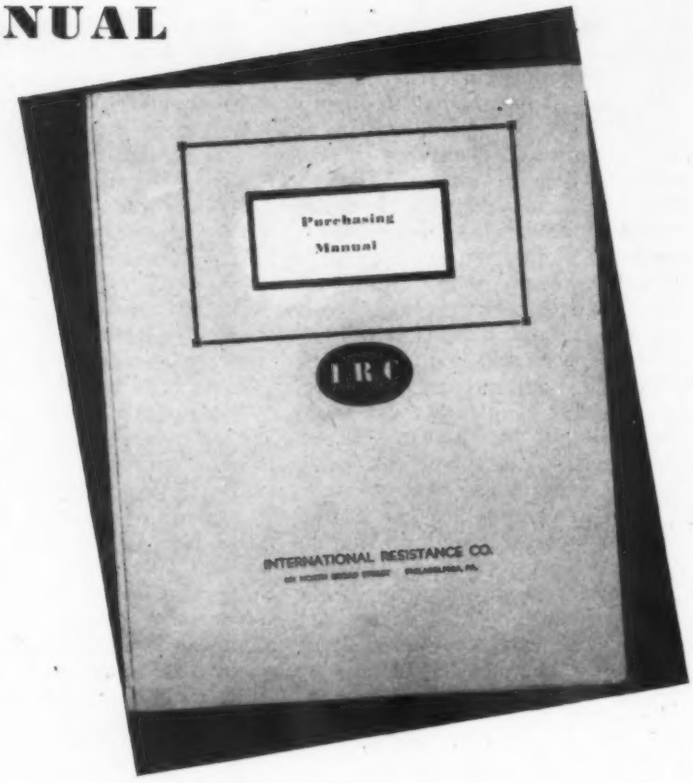
The experience and example of Miss Cummings in the organization and operation of this department show convincingly that purchasing is not necessarily a "man's job". Let's analyze the qualifications of a successful purchasing agent. The job requires interest in the work, common sense, a shopping instinct, a determination to succeed, and some measure of primary training. The purchasing agent must have the knack and the personality to encourage cooperation and mutual confidence among various departments, as well as with the suppliers of materials. Another requirement is the ability to maintain an open mind and the willingness to listen to the opinions of others. Then, the courage to make decisions.

It is obvious that women may have all of these qualifications to a high degree, as well as men. Miss Cummings does not consider her own case to be in any sense exceptional. As a matter of fact, she is a charter member and active worker in the Women's Division of the Chicago Association of Purchasing Agents, a group in which scores of similar examples may be found. That's encouragement for the increasing number of career women in purchasing, and particularly for the many women who have come into purchasing work during the years of the manpower shortage and who wish to advance in their chosen field.

Heavy mechanical and electrical equipment make up a large part of this purchasing program

A PURCHASING MANUAL

● Compiled by ***H. J. McCaully, Jr.***
Assistant Works Manager
International Resistance Company, Philadelphia



Standard instructions covering purchasing policies, procedures and regulations at the International Resistance Company

PURCHASING is one of the most common business activities. It means the selection of some kind of property and its acquisition by giving an agreed price or consideration in return for it. Fundamentally, it is simple, but with industrial requirements it becomes complicated and requires control and intimate daily contact. The proper handling of purchasing and the administering of the business features connected with it are vital factors in the successful operation of a company.

The business of International Resistance Company is based on its ability to dispose of, at a profit, the products manufactured. The products are represented in some form of material, to which has been applied various manufacturing operations which are the result of engineering and manufacturing planning. In the various products of IRC material represents between 30% and 50% of cost.

Due to the rather substantial percentage of cost, represented by materials, it is of vital importance to establish sound policies and procedures for the orderly and efficient procurement of materials and the control of all purchasing functions. Therefore, the purpose of this manual is to outline the objectives to be attained and the general procedures required to acquire quality materials in sufficient quantity at the time they are needed and at an economical price.

While detailed application of methods and procedures may vary for different kinds of material, basic principles are applicable to all. The ultimate effectiveness of the procedure will be determined by the ability to administer and control the four fundamentals of material procurement whose importance are generally in the order named:

1. Quality
2. Quantity
3. Delivery
4. Price

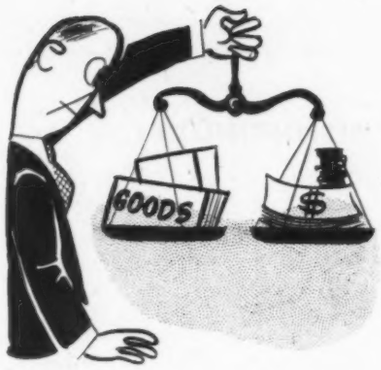
In order to accomplish our aims and the aforementioned fundamentals of material procurement, we must:

1. Clearly define sound purchasing policies
2. Establish an efficient Purchasing Department
3. Set forth responsibilities and procedures

In addition to the above major objectives, a section of this manual has been reserved for that all important phase of purchasing which concerns the behavior of the buyer to the salesman and the vendor.

This manual is not a cure-all for the many and varied problems that arise in purchasing and there is no easy road to the perfect purchasing organization. It requires hard work, constant attention to detail, enthusiasm, good judgment and above all, persistence. But the results are worth the effort and we cannot afford not to do a good job of purchasing.

H. J. McCaully Jr., discussing a purchasing problem with Purchasing Agent Frank Dengler.



II. PURCHASING POLICIES

EVERY transaction between a Buyer and a Seller, involving the transfer of property, is a contract. Some contracts are of the simplest form, while others are made the subject of lengthy written agreements defining the nature of the material, price, the method of payment, performance required by both Buyer and Seller, etc. From the inception to the consummation of a transaction between a Buyer and Seller many important problems are involved. The proper handling of these are vital factors in the successful operation of a company.

Purchasing requires careful study and training, and should be done by specialists in its activities. The successful Buyer must constantly study markets and keep informed concerning the materials he buys. He must have carefully complied and easily available records of the purchases of his department, extending over a period of years.

Reliable records of dependable sources of supply are necessary to successful purchasing. These records must be kept up-to-date and must be instantly accessible. Every Purchasing Department must systematically select information for its own use from the mass of material that comes to it every day. It must be constantly looking for new vendors, new materials, new grades and better delivery and prices.

Purchases must be made in accordance with prevailing market conditions, placing orders for scheduled future delivery where possible. Really efficient purchasing is shown in the time chosen for making purchases and in prices obtained.

The responsibility for these activities should be placed on those who have the interest and the skill to do the work properly, and whose primary concern is the performance of this special task. This requires the setting up of uniform policies with respect to vendor relationships.

Recognizing the importance of buying to the best advantage, all materials, equipment and supplies needed for the conduct of our business in accordance with specifications requested, the following policies should be rigidly adhered to:—

1. The Purchasing Department will conduct and conclude all negotiations affecting purchases, prices, terms, delivery, etc.

2. All requests for prices and all purchases must be made by the Purchasing Department.

3. Intermediate negotiations, communications and interviews may be conducted between members of other Divisions or Departments and vendors or their representatives, but all such contacts shall be conducted only with the knowledge and approval of the Purchasing Department.

4. All correspondence with suppliers must be through the Purchasing Department except in special cases where the technical details involved make it advisable to delegate authority to others. In all such cases the Purchasing Department must receive copies of all correspondence.

5. In interviews with salesmen, no one who is not a member of the Purchasing Department shall commit himself on preference for any product, source of supply, nor give any information regarding competitive performance, final approval or price.

6. The Purchasing Department shall frequently confer with Engineering, Manufacturing and Material Control and be granted ample opportunity to offer and accept suggestions. It is the responsibility of the Purchasing Department to explore the markets for new sources of supply, new material, processes and ideas.

7. The Purchasing Department may anticipate requirements of materials or equipment when market trends point to an advantage. No final commitments shall be made, however, for such anticipatory buying until an agreement has been reached with Sales, Engineering, Manufacturing and Financial Divisions.

8. Purchase requisitions, bearing the proper signature (not rubber stamps) are the Purchasing Department's authority to buy for the Company. Such requisitions must clearly state the need, specifications and delivery required.

9. The Purchasing Department will have the authority to question requisitions with regard to the quality and kind of material, quantity and stated delivery requirements. The preparation of specifications and requisitions must not be unduly restrictive, in order that the choice of sources will not be narrowed to a point which stifles competition and interferes with advantageous procurement.

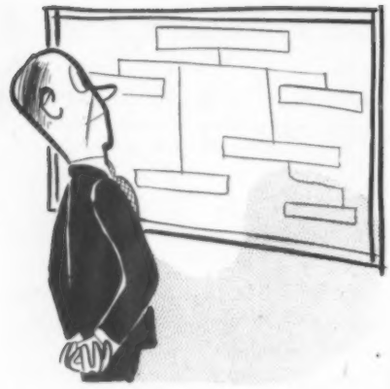
10. The Purchasing Department will endeavor, in every way possible, to obtain two sources of supply on critical materials even to the extent of a price differential to inusre a continuous supply.

11. Salesmen should be received regularly in the Purchasing Department and in other departments by request. Interviews with salesmen should be limited to the hours between 10:00 A.M. and 3:00 P.M. in order to allow sufficient time in the morning and afternoon to perform regular department functions.

12. It is within the province of the Purchasing Department to delegate representatives of other departments to select material but actual purchasing can be done only on the Company's approved order through the Purchasing Department.

13. In cases of extreme emergency, and only in such cases, may an exception to the above rule be made, with the understanding that the head of the department placing the emergency order assumes the personal responsibility of immediately following the verbal order with the proper requisition to the Purchasing Department with full details.

14. Every employee of this company should be forbidden to accept from any vendor, for himself or his family, at any time, gifts or gratuities in any form.



III. ORGANIZATION AND RESPONSIBILITIES

BECAUSE of the importance of purchasing activities to manufacturing operations, the Purchasing Department should come under the Manufacturing Division and report to the Assistant Works Manager. A typical purchasing organization should include the following, however, the number involved will depend on the size and complexities of the operations:

Purchasing Agent
Assistant Purchasing Agent
Buyer
Expeditor
Order Posting Clerk
Typist

Inasmuch as Purchasing activity is entirely an expense item, it is the responsibility of every member of the Purchasing Department to watch all items of expense that they be kept to a minimum.

Telephone expense must be constantly watched and long distance telephoning should be accomplished within the minimum charge time. Where telegraphic service will accomplish the result, it must be used. Night telegraph service is cheaper than day service. Airmail will many times accomplish the same result. It is to be noted that handling transactions by telegram or letter establishes a definite record which is not possible by telephone.

Traveling, including the use of automobile, by Purchasing Agents, Buyers and others to vendor's plant should only be encouraged where it adds to their education and benefits the Company. Good judgment as to incurring this expense is necessary.

Blueprints are a large expense item. They must not be ordered except as actually required and in number actually needed. Private files of blueprints will not be tolerated. Many blueprints are of a confidential nature and must be controlled according to current rules.

Essential statistics must be maintained currently, summarizing periodically, monthly or yearly, in the proper units, the record of the various elements of the Purchasing activities, that such information can be furnished to the management.

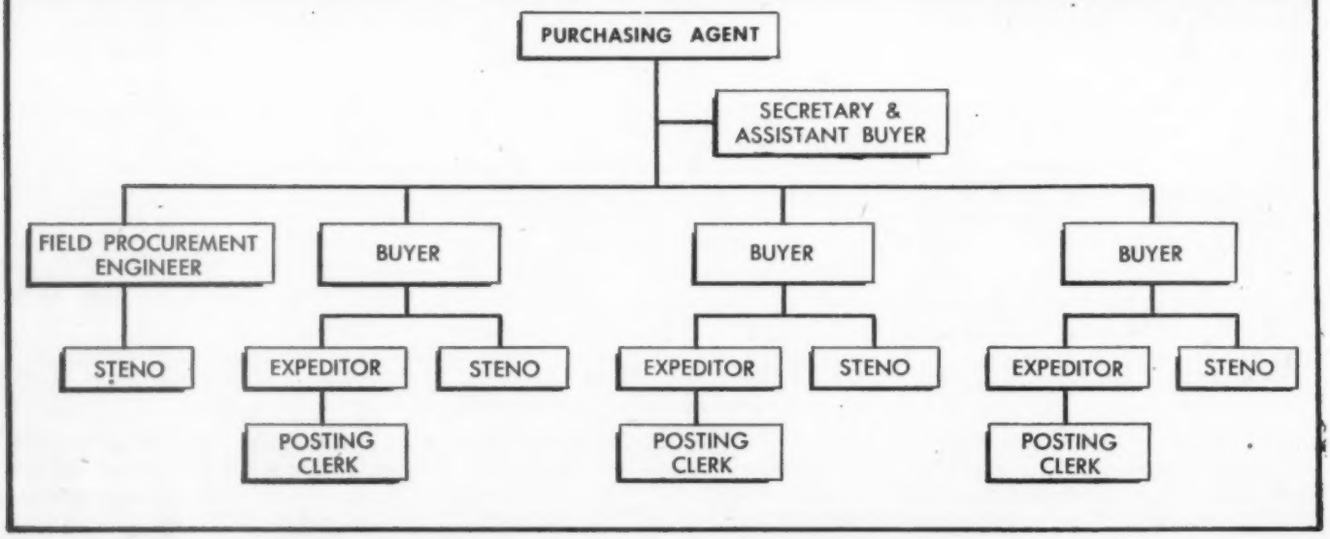
Purchasing Agent—is responsible directly to the Assistant Works Manager for:

1. Procurement to the best advantage of all materials, equipment and supplies in accordance with specifications as stated and required.
2. Establish general policies and procedures in connection with purchasing operations.
3. Give effective assistance to plant executives in cutting down expense by recommending substitutions of better and/or less expensive materials, reducing product cost and controlling material inventories.
4. Efficient operation of his department.
5. The conduct and performance of all members of his department in accordance with their respective responsibilities and duties as outlined.
6. Compliance with Purchasing Department and other Company policies, procedures and regulations.

Buyers—will be responsible to the Purchasing Agent or Assistant Purchasing Agent in charge of Buyers for performance of the following duties:

1. To keep well informed of Company policies and procedures relating to his functions and assume the responsibility for compliance with same.
2. To be well informed of commodities and products assigned to him and possess an intimate knowledge of markets, sources of supply, prices, terms and trends.
3. To assume responsibility for negotiating to the best advantage, the purchase and delivery of items

INTERNATIONAL RESISTANCE COMPANY
PURCHASING DEPARTMENT—ORGANIZATION CHART



and quantities requisitioned in accordance with specifications and delivery requirements.

4. Contact Material Control or other Requisitioning Sections when there is reason to question quantities, kinds of material, specifications or delivery requirements.

5. To assume responsibility for all purchase orders and communications issued by him and for the overall conduct and performance of personnel reporting to him.

6. To promptly request expediting assistance in accordance with established procedures when such assistance may be helpful in procuring materials.

7. To continually explore the markets for new sources of supply, new materials and methods. File a report to the Purchasing Agent, covering discoveries of interest.

8. To keep informed of vendors' financial status, labor policies and engineering and manufacturing capacities.

9. To assume responsibility for the performance of follow-up duties.

10. To assume responsibility for clearance of all claims and return of rejected material.

10. To assume responsibility for clearance of all claims and return of rejected material.

11. To assume responsibility for maintaining complete and orderly records and files of his activities.

12. To accumulate genuine examples of savings and outstanding accomplishments and report these each month to the Purchasing Agent in duplicate.

13. To assume responsibility for accurate and prompt handling of functions dealing with follow-up, order and invoice posting and clerical work in his section.

14. To assume responsibility for obtaining delivery schedule information on all orders under his supervision and making sure follow-up is properly performed.

Expeditor—will be responsible to the Purchasing Agent or Assistant Purchasing Agent in charge of expediting and follow-up for:

1. Responsible for performance of posting all information to ticklers by posting clerks.

2. Prepare schedule of requirements on open purchase orders for possible field follow-up.

3. Contact all vendors on open purchase orders not actually followed in the field.

4. Check all internal sources, such as Material Control before initiating request for follow-up.

5. Secure approval from buyers on discrepancies and to settle any questions that are brought to his attention by his posting clerks, such as invoice discrepancies, delivery errors, over and short shipments against purchase orders.

6. Maintain complete records on all follow-up activities and see that all requests are handled with promptness and dispatch.

Order Posting Clerk—will be responsible to the Follow-up Supervisor for:

1. Post all pertinent information to tickler including vendor's acknowledgment, delivery promise, price changes and other vital data so that tickler at all times will reflect a complete case history of that particular order.

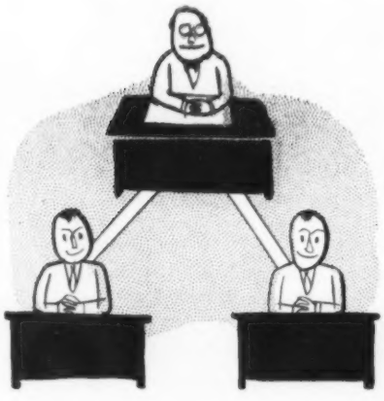
2. All posting to ticklers is to be kept currently up-to-date. Entries are to be made in black ink. No erasures are to be made—cross out errors in red ink and ink in new information.

3. Pull tickler every morning that require vendor contact by the Expeditor on that date.

4. Keep Expeditor informed on all matters that affect the supplier.

5. Keep ticklers properly flagged so that you will not have to rely on memory to get proper ticklers worked on daily.

Ordinarily, the posting of invoices and clearing same for payment is a purchasing responsibility. However, at IRC, this function is under the Accounting Department. Briefly, their responsibility is to check all invoices and receiving sheets with a copy of the purchase order to see that prices and quantities agree and to clear same to Accounts Payable for payment. See that any discrepancies are cleared with the Purchasing Department on day of receipt or as soon after as possible and to report to their supervision any item on which they cannot secure immediate release.



IV. RELATIONSHIP TO OTHER DIVISIONS

THE Purchasing Department is a service activity to all other departments and complete cooperation and mutual confidence are absolutely essential to attain Company objectives. The attitude of other departments will be a reflection of Purchasing Department service and, to a large extent, will be the standard by which its efficiency is measured.

The buyer must have an appreciation of the particular requirements of the several users of materials and services and must exercise tact, discretion and diplomacy to establish and maintain harmonious relations with other departments.

Other departments must keep Purchasing Department advised of current and anticipated activities—volume of business—new business—new products—new designs—etc.—in such detail as will assist, in advance, competitive negotiations. The Purchasing Department, in each instance, must assume the necessary confidential control.

Specific responsibilities toward other departments can be briefly stated as follow:

Sales—It is the duty of the Purchasing Department to assist Sales by keeping them posted as to market price trends, deliveries, etc., that they may have this information in meeting competition and distributing to their market.

Engineering—The functions of Engineering and Purchasing are directly related, and close cooperation is essential for best results. As competition brings out the best or

latest developments, as well as the best price, the Purchasing Department must be given reasonable latitude in making purchases. On the other hand, Purchasing must give due recognition to the requirements of Company product performance.

It is to the interest of the Company that Engineering Department recognize the need that they be not too exacting in their specifications; that they recognize the fact situations of price, source, delivery, convenience in production, etc. should be weighed along with those of design.

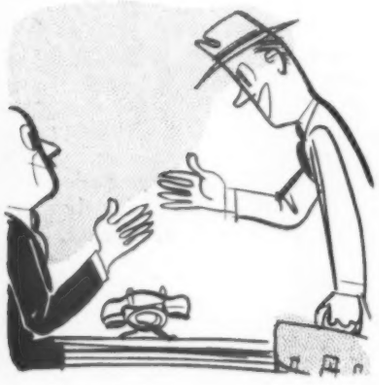
Accounting—The principal Purchasing activity with Accounting, is the approval of invoices. The great number of invoices requires that they must be cleared daily, that this work may be handled in a routine manner at the least expense. Thorough adjustment of claims in connection with material received, and invoice differences, must be handled promptly and completely supported by written records that final decision and adjustment may be certified.

Manufacturing is the most important in Purchasing contact and service, therefore, it is necessary that the Purchasing Department be prepared to support the following program, calling attention to specific items of high cost, long delivery, tool cost and probable effect of detailed specifications and tolerances:

1. Estimate price and delivery of requirements at the time a proposal is under consideration for a Sales quotation.
2. Assist production planning and scheduling by maintaining up-to-date firm prices and delivery and, at the same time, call attention to items requiring special action.
3. When planning is complete and requirements are to be ordered, set definite delivery dates, consistent with market conditions, to meet the shop program.
4. Prompt follow up for Order acknowledgment by vendors and check acceptance of price and delivery date, with prompt notice to factory and other interest departments of any change affecting production or costs.
5. Effective follow-up of established delivery dates to assure vendor's performance.

The maintenance of power supply, plant equipment and other facilities is an important item of expense. It is expected that the Purchasing Department will assist in reducing such costs and act promptly in emergencies to avoid manufacturing delays.

Purchasing must maintain close contact with Incoming Inspection so that material below quality will have immediate vendor correction and prompt replacement. This information must be recorded and analyzed for vendor selection and elimination. Warehousing and Receiving must be promptly notified of unusual quantities to be received, handled and stored and of special shipments requiring immediate or special handling.



V. VENDORS AND SALESMEN

IT has long been considered good sales policy to develop goodwill on the part of the customer toward the seller. It is just as essential to develop goodwill between International Resistance Company and its suppliers. The buyer has it in his power to enhance or detract from the Company's good name in his relations with vendors and their salesmen, and has a major responsibility to form a good reputation for the Company and the goodwill it commands. Purchasing Department employees have an exceptional opportunity to present the Company and its products in their contacts with others. Every opportunity should be used to advantage.

It should be recognized, however, that much of the success of the Company's operations depends on Purchasing acquiring materials in sufficient quantities, when needed and at an economical price. Therefore, these important requirements should not be superseded by goodwill. In their negotiations with the vendor or salesman, Purchasing should be firm, reasonable and insistent that they meet our requirements and specifications. This must and can be done without impairing goodwill.

It is evident that great responsibility is placed upon Purchasing Agents and Buyers to use their authority in such a manner in their contact with vendors and salesmen that there will be a continuity in mutual understanding and responsibility so that the Company's manufacturing activities are properly supported. In negotiating with vendors and salesmen, there are certain points of personal character and ethical contact that are requisites of a good Purchasing Agent or Buyer. Courtesy, honesty, fairness and firmness each have their place in this activity.

To the Salesmen

1. See him without delay. If, however, he has violated routine rules, tactfully call the matter to his attention.
2. Let him tell his story and analyze it while listening.
3. Talk business.
4. Answer ethical questions.
5. Be truthful in all statements.
6. Cover all elements of purchasing that the final understanding is complete.

To the Vendor

1. Do not ask any vendor to quote unless you conscientiously expect to consider him as a supplier at final determination.
2. Keep specifications fair and clear.
3. Keep competition open and fair.
4. Respect the confidence of vendors in all quotations.
5. Do not take improper advantage of vendors' errors.
6. Discourage revision of bids by insisting on best price on first bid.
7. Cooperate with vendor in solv-

ing his difficulties.

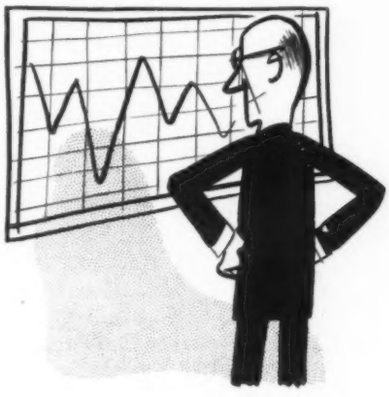
8. Be courteous in stating rejection of bids with explanations that are reasonable.
9. Answer letters promptly.
10. Avoid all obligations to vendor except strict business obligations.

Thoroughness, aggressiveness and discerning domination are essential in all Purchasing activities but particularly in dealings with vendors and their salesmen.

1. State all conditions of each purchase and be prepared to negotiate with vendors intelligently and complete the purchase to avoid any subsequent follow-up, correspondence and adjustment.

2. Be aggressive in securing added knowledge that will assist the Company and vendor in quick, intelligent and complete negotiations. Receive suggestions from any source and act upon them.

3. Domination can be handled in in a courteous manner. At no time should offense be given to vendors or their salesmen. However, the activities of the Purchasing Department are prescribed between the date of determination of requirements and the date scheduled for their use. To accomplish this, each negotiation and purchase must be handled quickly. The buyer must allot his time so that a good job is done on each purchase. Conversation must be guided to the subject under consideration and the conference concluded promptly but courteously.



VI. FUNDAMENTALS OF MATERIAL PROCUREMENT

AS mentioned in the opening section of this Manual, there are four fundamentals of material procurement whose importance is generally in the order named:

1. Quality
2. Quantity
3. Time (Delivery)
4. Price

1. *Quality* is the first principle of good buying and generally considered the most important. It takes this position because proper quality is a necessity for Company product performance and to a degree, the quality specified has a direct relation to cost.

Acceptable quality must be determined before requirements. The determined quality must be specified on the requisition and in the purchase order, or in written specifications atttached thereto. This has two objectives:

1. That the vendor may know grade of material expected.
2. That material received may be inspected to the requirements as specified on the order.

Specification by sample is to be discouraged except in emergency cases. This method of ordering is subject to dispute due to lack of material specification, physical change or substitution, unless some written description of use and performance accompanies the sample.

All specifications should be:—

1. As simple as consistent with exactness but so specific that no loophole will allow any bidder to evade any of the provisions and thereby take advantage of the Buyer.
2. Clear as to the method of checking, which will govern the acceptance or rejection, to avoid future controversy.
3. Reasonable in all details consistent with the requirements, to be fair to both the Buyer and Seller.
4. Reasonable in accepted variations and tolerances.

The greatest responsibility of the Purchasing Department is to select reliable vendors, supply them with complete specifications and cover all elements of purchase with a complete understanding in all negotiations. This is necessary to avoid rejections. Replacement indicates nondelivery and added Company expense, and is a prime factor in considering vendor selection, retention or elimination.

2. *Quantity* is an important consideration because it involves both manufacturing schedules and price. In buying quantity for product manufacture, current market conditions, commodity, standardization, and the Company production schedule will govern and vary buying practice.

1. Certain requirements in exact quantities for individual shop orders and scheduled for exact delivery date.
2. Certain items in larger exact quantities with scheduled deliveries.
3. Standard parts in quantities according to rules governing maximum and minimum stock.

In addition to buying quantity for requirements, there are two other governing factors:

1. Protection against delays in manufacturing by suppliers due to labor troubles, breakdowns, etc.
2. Price situations in current and future commodity markets.

It is not a function of the Purchasing Department to determine requirements. This is decided by Material Control, to support Sales demand for the product. The Purchasing Department, however, should be kept informed continuously regarding operating conditions and any anticipated changes which will affect demand. Purchasing should, however, use good judgment in placing orders so that advantage can be obtained by quantity purchases. Wherever possible two sources of supply should be maintained, especially on large quantity items and those of a critical nature.

In ordering maximum and stock quantities, the following should be considered::

1. Length of time to consume quantity ordered and inventory investment.
2. Delivery cycle.
3. Interest and carrying

charges.

4. Storage space required.
5. Purchase price advantage.

Governing conditions change with commodity, from season to season and from year to year. Purchasing records must indicate currently most economical ordering quantities, so that it will not be necessary to determine this for every purchase. This information must be regularly supplied to Material Control Dept. and others, that cooperative action result in Company gain.

3. *Time (Delivery)* "Time is of the essence of this order" is a legal phrase protecting the rights of the Buyer, used in connection with most purchase orders and contracts. While time has been stated as the third fundamental of purchasing, its importance is practically equal with that of the others.

Company sales are made on promise of delivery by the Manufacturing Dept.; Manufacturing Dept. promises are based on Purchasing Dept. promises which, in turn, are the promises of the Vendor. Therefore, the goods ordered to support Manufacturing must be received on time, and it is the duty of the Purchasing Agent to negotiate purchases so that this will be accomplished.

Recognizing, with regret, that vendors' promises in all too many cases are not met, it is essential that Purchasing establish the most efficient and, at the same time, the most economical system of anticipating or discovering delays in time to take corrective action. Many systems have been devised but the most effective is a visual control board which will immediately call the Buyer's attention to parts or materials which require expediting. The time to expedite is before the scheduled delivery date and not when the shipment is overdue.

Delivery on accepted promise date is the direct responsibility of the Purchasing Agent or Buyer. Routine systems of checking evidences of performance and delays may be handled by clerks or other assistants. The responsibility still remains with the Purchasing Agent or Buyer who must, periodically, review the situation of commodities under his control and open orders with vendors responsible for the furnishing of these commodities.

The Purchasing Department must keep informed as to delivery possibilities and guide other departments in setting schedules. Other departments must secure mutually acceptable delivery dates from Purchasing in setting their schedules. Proper planning far enough in advance of requirements and cooperation will result in best accomplishment attainable and at the least cost to the Company.

4. *Price*—the real cost of the goods purchased is represented in their ultimate cost in the finished product. The Purchasing Department is responsible to obtain the greatest possible ultimate value.

While it is necessary to use competition to secure quality, quantity and delivery, the greatest use of competition is to establish the best current price for acceptable goods. To evaluate competitive price comparisons, the Buyer must have a thorough, intimate and current knowledge of:

1. Uses of material
2. Possible variations
3. Past and current prices
4. Probable prices of the immediate future and beyond

There are many factors in price structures that the Buyer must know in considering current quotations, as follows:

1. Supply and demand
2. Business cycles
3. Patents
4. Substitutions
5. Price trends

In considering competitive bids from several vendors, the lowest bid is not necessarily the best buy any more than the highest. All factors must be considered and, especially where a bid is exceptionally low, the buyer must know or find a reason.

It is impossible for the Buyer to assume the responsibility of remembering each price, therefore, it is not good practice, where a large volume of purchases is handled, to depend upon personal knowledge or memory. Proper records of all purchases must be maintained that previous prices will be available for comparing current quotations as well as for estimating cost for Sales proposals.

Tool charges or tool allowances are also a part of the price structure to be considered in purchase negotiations. Tools are included in price in many instances, other cases tools are quoted separately. It is considered good policy to have vendors quote separately on tools so that the piece price remains constant thereby establishing fixed cost standards for purchased parts.

Tool ownership, replacement, repairs or upkeep must be definitely established before purchase is placed. Where possible, tools must become the property of IRC; subject to shipment on Company orders without further changes. Where industry or commodity practice is otherwise indicated and tools may be removed for additional charge, this must be established and become part of the order. Record of all tools in the custody of others must be kept up-to-date by Purchasing that a periodic check may be made to verify charges as well as reporting to the Accounting Department for insurance coverage.

VII. CONCLUSION

THE Purchasing Department exists through the need of the Company to secure goods for its operations. As stated in other chapters, this means the right quality of material on hand in the right quantity at the right time at the right price. The successful Purchasing Dept. fulfills this responsibility.

To fulfill the demand for purchasing service, it is necessary to establish certain definite routines, systems and forms to carry on the day to day work as well as to record such information as is necessary

(*Continued on page 342*)

Pages From a Buyer's Notebook

PORTAL TO PORTAL

The portal-to-portal pay argument of the labor people intrigues me. Of course it isn't new; the plumbing trade discovered and used that system long ago. But when your shop mechanics figure their day from the time they leave their car in the parking lot until they get it headed homeward in the evening, it becomes more than a cartoonist's gag.

It set me thinking about the cost of materials. The invoice price doesn't begin to tell the whole story. The entering portal is way back at the producer's siding where we take title to the shipment. There's a good sized freight and insurance bill on the stuff before we ever see it. Then it has to be unloaded and put in stock. Nearly one-third of our floor space is devoted to storage, and that costs money. Stores clerks and watchmen have to be paid to keep an eye on it while it just lies there, and more insurance accumulates. There's a surprising amount of paper work involved, quite aside from our purchase records. Finally it has to be handled again, and there's more paper work, to get it to the machine, which is the outgoing portal so far as my responsibility is concerned. We manage a pretty good turnover, but meanwhile the comptroller has added a stiff charge for interest on working capital.

The fellow who figures an average 10% carrying charge is really conservative. But the buyer who accepts the invoice as a measure of total cost had better think again.

THREE LEGS OR FOUR?

Among my clippings of twenty years ago, now obsolete, the typical management organization was represented as a three-legged stool, resting upon the classic functions of production, finance, and sales. Everything else was incidental.

I am replacing these with a current clipping from the November 1946 issue of "Modern Materials Handling".

The article, by a partner and senior consultant of one of the country's outstanding firms of management consultants, contains a "Typical organization chart for a large corporation, defining executive responsibilities." It shows at the top of the chart, the President, flanked by a Staff Assistant or Coordinator, and in the top tier of functional executives are four divisions instead of three. These four executives, reading from left to right, are the Plant Manager, Sales Manager, Comptroller, and Purchasing Agent. These are the executives which modern management engineering accepts as basic and essential.

Modern management science has found that the four-legged stool provides a more sound and firm foundation than the old three-legged variety.

WEAKEST LINK

No purchasing program is stronger than its sources of supply.

The force of this rather hackneyed proverb was freshly impressed upon a good many purchasing agents during the recent unpleasantness in the soft coal industry. I was one of them. Sometimes it takes a Grade A emergency to make us see an obvious truth.

Our company had foreseen the situation, and we were reasonably well fixed with twenty-four days' supply on our stockpiles when the strike was called. The power superintendent said that he could stretch it to cover six weeks' operations if necessary. It didn't seem probable that the tie-up would be permitted to last longer than that. All things considered, we were sitting pretty.

And then I discovered that a local foundryman, on whom we depended for twice-a-week deliveries to keep going, was caught with exactly three days' fuel supply. He was a steady, reliable sort of fellow, handy to our plant, and we had never bothered to split the work with an alternate supplier. But this time he had surely missed the boat badly, and for all the good my stockpile did me, I was down to the same limit.

We got out of that jam after a fashion, at the cost of plenty of sweat, aspirin, and good cold cash. But one thing is sure. Next time we see anything like that in the offing, our critical sources are going to be tipped off to get ready for it. We want our supply sources to be a strong as we are.

OUNCE OF PREVENTION

The General Manager of a prominent and successful manufacturing organization was discussing the inventory problem recently, before a businessmen's association.

He pointed out that there are many departments concerned with inventories, and that they can all assist in keeping it under control.

Adequate inventories are a "must" to the manufacturing departments, and their tendency is to ask for a liberal margin of safey. But when a closer inventory policy is indicated, production men have shown that it is possible to operate out of "shoestring" inventories, and their cooperation is invaluable.

Inventory turnover—the relation of stocks to operating rates—is one of the key factors that determine a company's capital requirements, which come under the comptroller's responsibility. As a general rule, the comptroller can be relied on to keep a watchful eye on the situation.

But, this executive points out, both of these approaches are essentially corrective and swing into action only when the situation needs correcting. On the other hand, the purchasing agent faces this situation before it occurs; his policy and action is not corrective, but preventive. In that difference lies one of the great opportunities for the purchasing department to safeguard the interests of the company.

An ounce of prevention is worth a pound of cure.

POSTWAR PRICE TRENDS

By A. N. Weckeler

Which way
How soon
How far ?

BASED on historical precedent, prices during and immediately after a major war soar higher and higher, and then finally fall off sharply. Ironically enough, while Government spokesmen have been most outspoken in pointing to the perils of inflation, the Government policy has been to mother the high price levels with all the solicitude of the hen with a brood of baby chicks.

When the huge record-shattering agricultural crops seem on the verge of forcing food prices down, the Government steps in and supports the price at a level which makes it economical for the agricultural seller to hold the bulk of his crop off the market, releasing stock only at high prices. Result in the food picture has been that at the height of the harvest, prices soared to an all-time high level, contrary to the normal operation of the law of supply and demand.

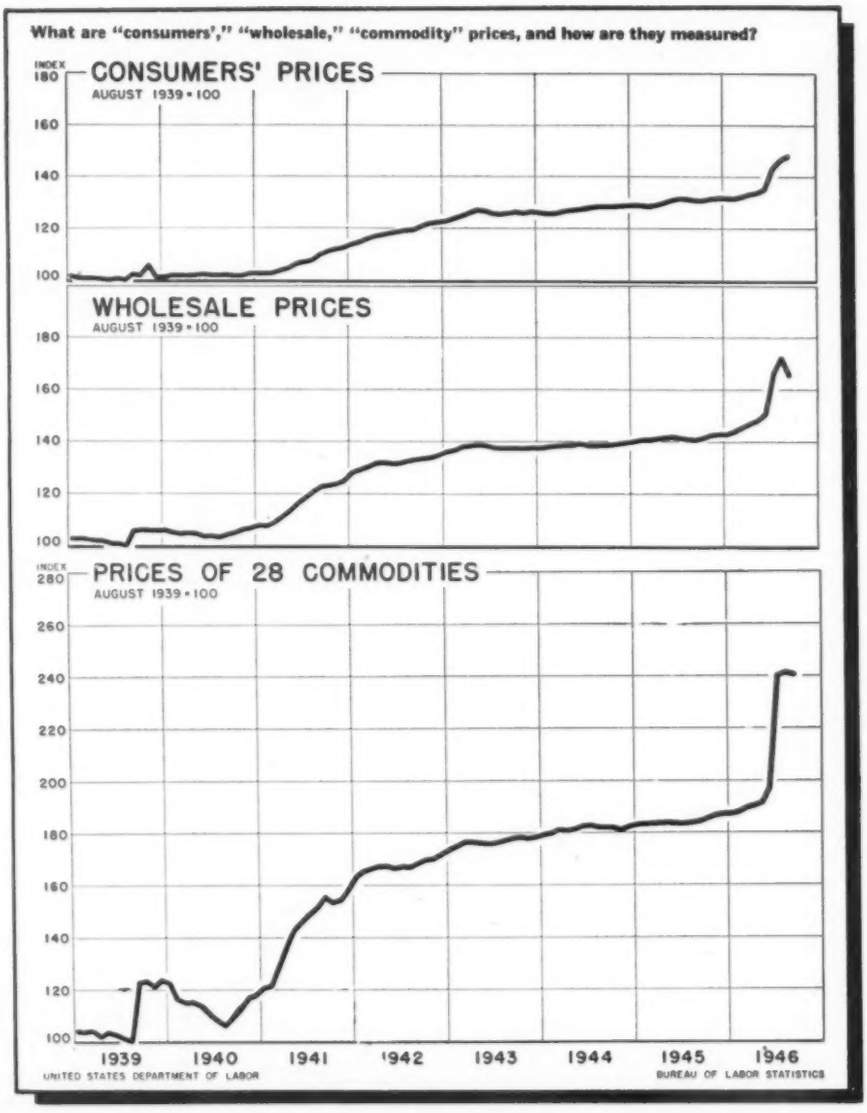
Government policy in the matter of wages has been to lend support to organized labor's demands for increases. Currently, the peak employment period seems to have passed, and still there is every indication that Government will unofficially encourage some further increase in wage levels.

This Government interference in the supply and demand picture adds a further unknown quantity to the price outlook.

Escalator Clauses

Still there are straws in the wind that Government support of the seller's position in creating artificial scarcity cannot permanently balk the ingenuity of the buyer. One indication is the development of strong resistance on the part of purchasing agents to escalation clauses. There is the growing realization that at least on short term delivery, firm prices are necessary—and with supply improving, it is again possible to talk in terms of quick delivery.

The wartime popularity of the escalation clause in all types of con-



Consumers' prices are those you pay the retail store, the newsboy, utilities, or the landlord for every-day living essentials (food, rent, clothing, house furnishings, electricity, etc.). More than 100,000 price quotations and 50,000 rents are averaged to get the general index. Some commodities and services are given more importance in the general average, according to the amount of purchases by moderate income families.

The wholesale price index includes 900 commodities traded in primary markets and about twice as many separate price quotations. It includes raw materials of all types, partly manufactured articles, and finished products. Commodities have different importance in the average depending upon the volume of sales in the years 1929-31.

The index of 28 commodities includes chiefly raw materials—wheat, corn, butter, hogs, steers, shellac, coffee, rubber, hides, etc. Prices are spot market prices traded on organized exchanges and move sharply with changes in market conditions. Each commodity in the index has equal weight, so that a sharp rise in one commodity may affect the total index substantially.

tracts grew out of economic necessity. In a rising price market, and without firm delivery dates, firm pricing was impossible.

While the Government is exerting influence that will tend to keep prices up, it is generally felt that the crest has been reached, and that a downward adjustment is overdue.

Escalation in long-term contracts, taking into account the upward and downward fluctuation on cost factors, is a matter of scientific adjustment in the position of buyer and seller after the general terms of the sale have been concluded.

Avoiding a Squeeze

In a routine purchase, however, escalation by-passes a major function of the purchasing agent. During the war, merely obtaining delivery was considered the finest flower of the art of purchasing. Price was not deemed a factor, as indeed most prices were fixed by the Government.

Now prices have become of paramount importance. While conditions do not appear to warrant any break in the commodity price structure—and while there may even be further increases in some prices — there is considerable consumer resistance to the high prices, and this imposes a strong influence of caution and similar price resistance back at the industrial purchasing level.

As against the seller's position of having to contend with higher costs, there are definite price limits beyond which the buyer cannot go without cutting heavily into opportunities for resale. From these conditions there develops a sharp squeeze at different levels of trade. In some specific instances, the manufacturer has taken the brunt; in others the distributor or the retailer has been squeezed.

It is the function of the purchasing agent to prevent the squeeze from affecting his personal level of operation. For this purpose, a return to the prewar simple sales agreements, eliminating all the elaborate formulae of escalation, is being increasingly seen as a prime necessity by purchasing agents.

Downward Adjustment

Still another need is a means of judging price trends. The period ahead will be marked by considerble price confusion. In an effort to maintain high price levels on seasonal items, sellers may be left with large quantities of unsold goods, which they will then mark down. This will give the impression of a price break, where actually the price reduction will be traceable to the perishable nature of the goods, rather than any reduction in replacement costs of the merchandise.

This latter development was amply illustrated in the women's clothing and fur lines, where the instance of a mild winter and misjudged demand for high price luxury lines left the sellers with considerable stocks of unsold merchandise. In

U. S. DEPARTMENT OF LABOR
Bureau of Labor Statistics
Washington 25, D. C.

INDEX NUMBERS OF WHOLESALE PRICES OF ALL COMMODITIES
(1926–100)

Years:	Jan.:	Feb.:	Mar.:	Apr.:	May:	June:	July:	Aug.:	Sept.:	Oct.:	Nov.:	Dec.:	Year
1890	54.7	54.8	55.0	55.1	55.6	55.4	55.7	57.8	58.4	58.1	57.1	56.6	56.2
1900	57.0	57.3	57.3	57.2	56.1	55.5	55.8	55.7	56.1	55.3	55.4	55.1	56.1
1910	71.4	71.3	72.9	73.2	72.0	71.0	71.0	70.8	69.9	67.9	66.4	66.6	70.4
1920	157.7	157.1	158.6	165.5	167.2	166.5	165.8	161.4	155.2	144.2	133.4	120.7	154.4
1930	92.5	91.4	90.2	90.0	88.8	86.8	84.4	84.3	84.4	83.0	81.3	79.6	86.4
1931	78.2	76.8	76.0	74.8	73.2	72.1	72.0	72.1	71.2	70.3	70.2	68.6	73.0
1932	67.3	66.3	66.0	65.5	64.4	63.9	64.5	65.2	65.3	64.4	63.9	62.6	64.8
1933	61.0	59.8	60.2	60.4	62.7	65.0	68.9	69.5	70.8	71.2	71.1	70.8	65.9
1934	72.2	73.6	73.7	73.3	73.7	74.6	74.8	76.4	77.6	76.5	76.5	76.9	74.9
1935	78.8	79.5	79.4	80.1	80.2	79.8	79.4	80.5	80.7	80.5	80.6	80.9	80.0
1936	80.6	80.6	79.6	79.7	78.6	79.2	80.5	81.6	81.6	81.5	82.4	84.2	80.8
1937	85.9	86.3	87.8	88.0	87.4	87.2	87.9	87.5	87.4	85.4	83.3	81.7	86.3
1938	80.9	79.8	79.7	78.7	78.1	78.3	78.8	78.1	78.3	77.6	77.5	77.0	78.6
1939	76.9	76.9	76.7	76.2	76.2	75.6	75.4	75.0	79.1	79.4	79.2	79.2	77.1
1940	79.4	78.7	78.4	78.6	78.4	77.5	77.7	77.4	78.0	78.7	79.6	80.0	78.6
1941	80.8	80.6	81.5	83.2	84.9	87.1	88.8	90.3	91.8	92.4	92.5	93.6	87.3
1942	96.0	96.7	97.6	98.7	98.8	98.6	98.7	99.2	99.6	100.0	100.3	101.0	98.8
1943	101.9	102.5	103.4	103.7	104.1	103.8	103.2	103.1	103.1	103.0	102.9	103.2	103.1
1944	103.3	103.6	103.8	103.9	104.0	104.3	104.1	103.9	104.0	104.1	104.4	104.7	104.0
1945	104.9	105.2	105.3	105.7	106.0	106.1	105.9	105.7	105.2	105.9	106.8	107.1	105.8
1946	107.1	107.7	108.9	110.2	111.0	112.9	124.7	129.1	124.0	134.1	139.6		

view of the annual change of styles in the women's garment lines, some of the clothing will be marked down below the actual cost of replacement of the materials going into the garments.

Obviously, similar breaks in staple items are not in immediate prospect. Nevertheless, consumers will be expecting price reductions, and companies will become economy-minded in order to achieve savings which will make price adjustments possible.

Wholesale Price Index

In casting about for some measurement of price trends, a number of indexes have been employed. Some have achieved wider acceptance than others, but there has been considerable question as to the extent to which such indexes can be used in a day-to-day business operation.

The Bureau of Labor Statistics wholesale index has come to be highly regarded as a yardstick of price trends. This index is designed to measure the average change in commodity prices at primary market levels. It is a weighted index derived from more than 800 price series which are combined into 49 subgroups, 10 major groups, and five important economic groups.

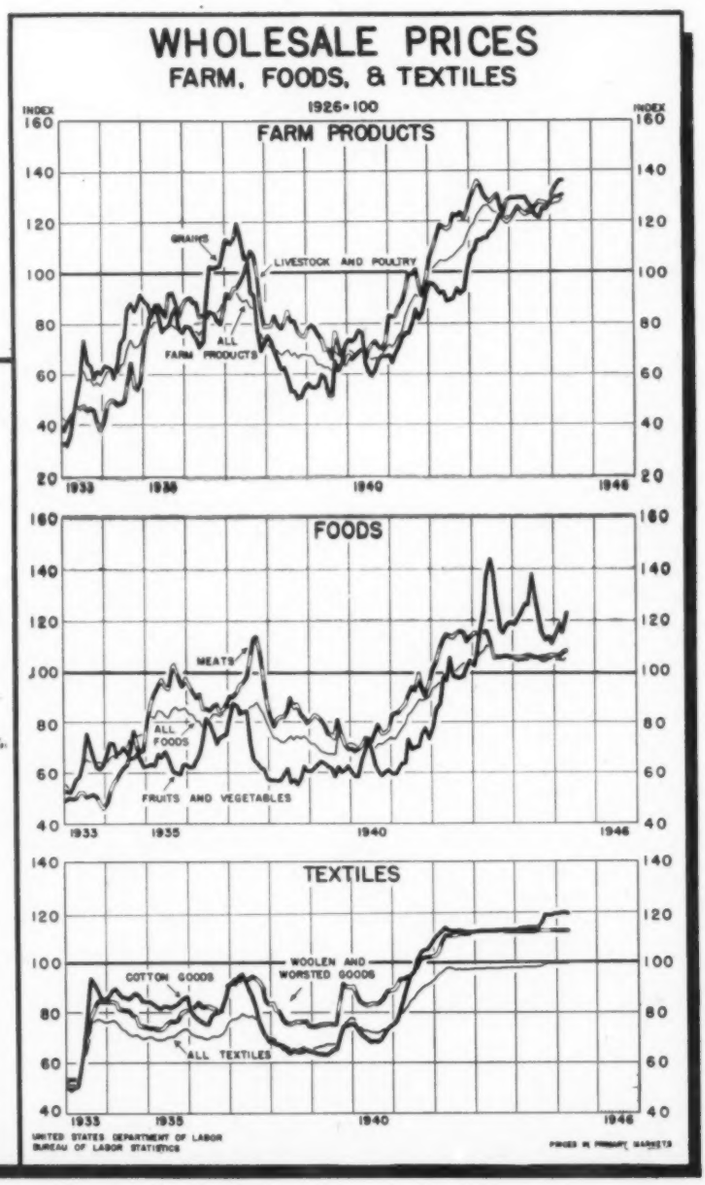
In general the prices used for the index are those charged by representative manufacturers or producers to types of distributors or industrial consumers which are characteristic of the particular industry. In the case of farm products and some foods, prices quoted on organized commodity markets are used.

Source of Prices

Wherever feasible, prices used for the index are f.o.b. point of production or sale. A commodity may be priced at several stages of production. For example cotton appears in the index as raw cotton, cotton yarn, cotton grey goods, cotton piece goods, and cotton clothing. For each of these stages a representative commodity is used and prices secured at the primary market level of distribution.

Commodities are priced in terms of a given specification at stated terms of trade to the type of purchaser accounting for the greatest volume of purchases. Shifts in the relative importance of sales to different types of purchasers, or in the distribution pattern of the industry, changes in the relative importance of sellers and variations in the specification of the commodities, are handled so as to cause no movement in the index.

A majority of the more than 800 price series are represented by a quotation from a single seller, since for standard articles, price movements of major producers are closely related. This is not universally true; for nearly 200 com-



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Region VII

Louis M. Solomon, *Director*,
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1355 Market Street,
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Seattle 1, Wash.

modities, quotations from 2 to 50 sellers are used for each article. In all, a total of about 1600 price quotations go into the index for each period.

Where commodities are standard and have a recognized market price, quotations are taken from trade journals. For nonstandard commodities and most manufactured goods, prices are secured directly from sellers.

Yours for the Asking

The index is calculated as a fixed base weighted aggregate. Current weights reflect quantities marketed in 1929-1931. These weights have been used since 1934 with minor changed dictated by changing market conditions.

Indexes are prepared weekly and monthly. They are issued in releases and published in the Monthly Labor Review, a publication of the Department of Labor.

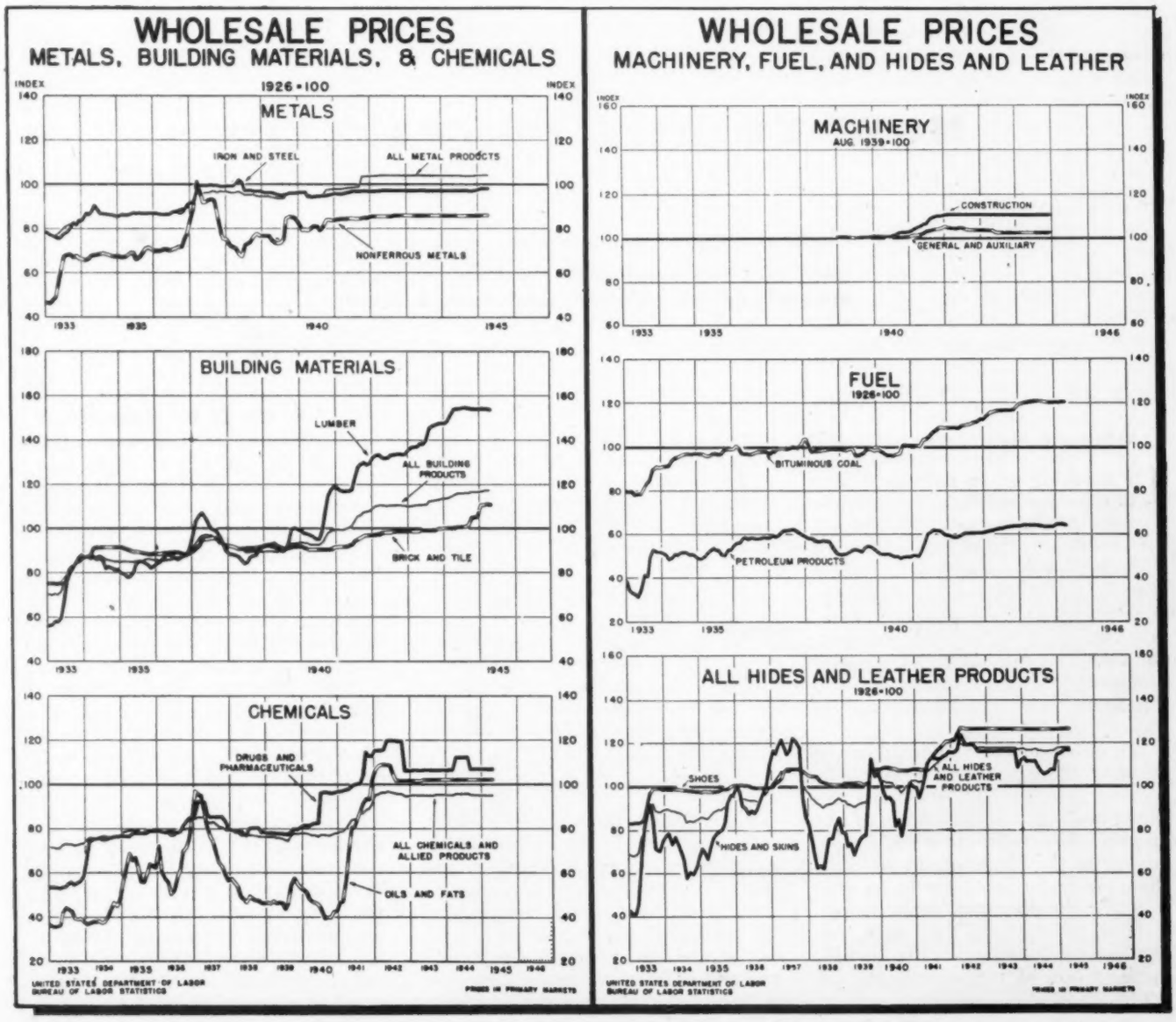
Three Regular Releases

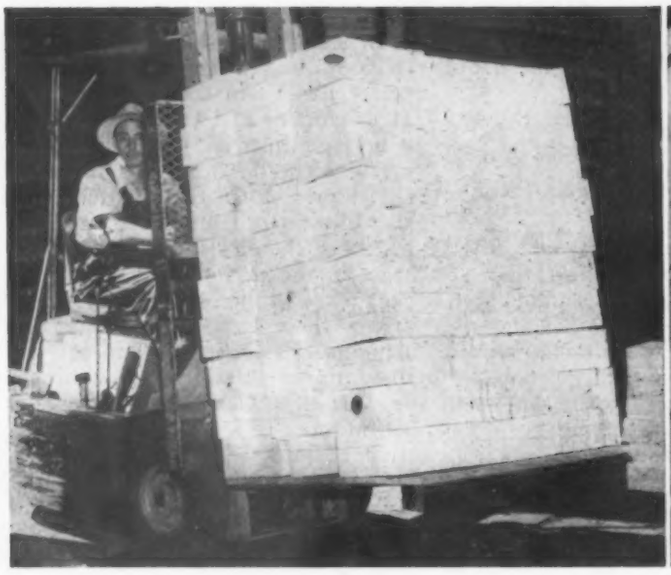
Three regular releases are available upon request:

1. A weekly statement analyzing current developments and showing indexes for major commodity groups.
2. A monthly 2-page table giving indexes for all commodity groups.
3. A monthly statement analyzing movements and giving current prices for each article included in the index.

To obtain this data at no cost, address request to Bureau of Labor Statistics, Department of Labor, Washington 25, D.C.

In using wholesale price indexes, it should be taken into account that price changes in some goods, such as machinery and the raw material which go into its production, are rarely reflected directly in consumer prices. In the case of materials entering directly into consumer products, there is considerable variation in the period over which the changes will be felt in consumer prices. For example, changes in slaughterer's prices for meat will show up in retail prices within 2 or 3 weeks. Changes in prices of cotton goods, on the other hand, have no effect on consumer prices for several months, because it requires time for the cloth to be manufactured into clothing and move into retail stores.





Most buyers of wood boxes procure them in shook form, which is the cheapest and best from all standpoints.

Certain chemicals possess characteristics which make a tight barrel the only container in which they can be held.

HOW TO BUY CONTAINERS

Practical pointers on the selection and procurement of primary packages and shipping containers to get your products safely to their market

• ***By E E. Rumple***
Merck & Company, Inc., Rahway, N. J.

IN speaking of an individual as a purchasing agent, it is generally necessary to mention the type of merchandise he buys and to identify the company he represents. This is true for the same reasons that make it necessary to classify engineers, doctors, and other professional persons. Due to the nature of his employment, the tendency is for the purchasing agent to become a specialist.

It is obviously impossible to know all there is to be known about every article we buy. We must assume, however, the obligation of acquiring the basic knowledge pertaining to the commodities we purchase in order intelligently to employ the fundamental procurement facts obtaining for any item, regardless of whether it be a machine, a box of tacks, or a roll of paper.

In my opinion these fundamental facts are in order of relative importance:

1. Specific knowledge of end use.
2. General knowledge of specifications.
3. The "know-where" essential to procurement.

Possession of these three things forms the "know-how" that proficient purchasing agents constantly seek.

The Three Essentials

Considering these facts further, let's take No. 1—"Specific knowledge of end use." A buyer should make it his business to know as much about the use of every article he buys as is practicable to obtain. He should determine its functional use and its relationship to the products of his company. By so doing, he can handle his transactions more intelligently and with a greater degree of satisfaction to his company, his vendor, and himself. Nothing is so exasperating to a vendor as a buyer who is not informed on such matters. Processing a requistion to buy on any other basis does not do credit to purchasing as a profession.

Now, let's take No. 2—"General knowledge of specifications." Before approaching vendors the buyer should familiarize himself generally with the specifications. Time may not permit mastery of all technical engineering details such as the thread pitch of a set screw or the molecular structure of a casting. It is entirely proper, however, that the buyer know the performance expected of the article and possesses a working knowledge of the standards by which such performance is achieved and evaluated. It is fur-

The fiber drum liner is Dow Chemical Company's Saran film M which is especially adapted for shipping solid chemicals, acid, organic materials and hygroscopic products. The liner comes in tube form, one end being tied before filling.

ther desirable that he know the manufacturing processes and techniques so that in considering the offerings of prospective vendors he can interpret them more accurately.

Going on to No. 3, we consider "The 'know-where' essential to procurement." Reference to a buyer's guide is often helpful. Except for isolated items, a buyer seldom lacks access to at least a half dozen possible sources of supply, even in tough times like the present. There will always be one or two of this number who are better equipped than the others by virtue of facilities, past experience, and integrity. For example, it is generally true that a large corporation cannot advantageously produce a small requirement, whereas a small manufacturer is geared to such things both in quality and price. Another important consideration is manufacturing facilities. Often a buyer finds "just what the doctor ordered" in the way of dies, jigs., etc., in a little out of the way plant, whereas the placing of the item with a more substantial concern would result in higher cost caused by tool charges, etc.

Packages and Components

Purchasing as a profession lends itself to classifications such as electrical engineer, surgeon, or admiralty lawyer. In many industrial organizations, it is necessary and possible to establish purchase classifications for the purpose of specialization. What has already been said along lines is of vital importance in the procurement of containers.

My affiliation with a chemical manufacturing company will naturally result in statements bearing on chemical containers, but generally applicable, I believe, to containers for any type of product.

A container might be defined as "anything that contains anything"; but for our purposes, let's be more specific. The first consideration is what might properly be designated as the *primary* container; namely, the bottle, box, can, tube, or bag holding the product in the form it is to be used by the consumer. The closure medium, the label and/or printing on the package constitute components of the primary package. The shipping box or outside protective medium, together with requisite cushioning material, make up the *secondary* container and its components.

Let us set up in our minds a hypothetical situation in which the XYZ Company has decided to market a new product. It has been decided that it will be packaged in a bottle with a screw cap closure and be contained in an attractive folding box. The item will be sold by the dozen and shipped to distributors in corrugated boxes. XYZ's purchasing agent now receives requisitions to purchase every component of the new package. While many companies have development departments to work out all details in advance, *it still remains the buyer's responsibility accurately to interpret them and to coordinate a multitude of details in order to bring the new product into being as far as containers are concerned.* By the time he has completed his job, he will have considered seven major points in relation to the primary container alone.

Seven Major Factors

1. *Bottle Capacity.* This is extremely important for chemicals and for all machine-filled items.

2. *Type and Color.* Type means shape in most cases, although for some products the chemical composition of the glass is important. The matter of shape determines the style of shipping box. Round bottles, incidentally, are the strongest and

The common slack barrel is a good shipping container. They can withstand great stacking loads, dependent upon the manner of tiering.

withstand transit better than any other shape. Color becomes a factor in the case of light-sensitive articles.

3. *Closure Finish.* Most bottles are made with standard finishes; however, the buyer must coordinate his purchase of closures with that of bottles to insure proper fit. A combination of maximum tolerances either plus or minus on both bottles and closures can result disastrously to a product.

4. *Closure Medium.* The most common, of course, is the threaded screw cap. Plastic molded caps are the modern thing, but metal caps are still the most widely used. The matter of closures is one which often does not receive adequate consideration. They must be tailored to the product, which brings in the subject of chemistry. Is it acid, alkali, or base, and to what extent? Does it fume? Is it hygroscopic or efflorescent? Is it stable? Will its form change under temperature extremes? Does it absorb odors readily? The answers to all of these questions contribute to determining the proper liner in the cap, also what sort of backing and adhesive are used. For example, metal caps are not suitable for high acid content articles, therefore the use of molded caps is necessary. Here again a molded styrene cap is suitable for most acid articles, but would be of no use on bottles containing a solvent product, in which case molded phenolic or similar plastic would be necessary. If the product is hygroscopic, absorbs odors readily, or has a fixed moisture stabilization point, it will be necessary to use a waxed or special liner in the cap to insure a tight seal.

Another consideration in the case of molded closures is that of dimensional stability. Believe it or not, but some plastic closures actually breathe in and give off moisture depending on relative humidity. This produces cycles of measurable expansion and contraction which can result in loose fitting closures, even though they were tightly applied in the first place.

To get back to the liner. First, the facing must be impervious to the contents. Secondly, if a liquid product is involved, the backing must be free of contaminating substances such as ink or dye which might be leached out. Third, the bonding adhesive must be odorless, particularly in liners used on odor sensitive products. For solvent items, the bonding adhesive must be insoluble. All of these things apply to both metal and molded closures.

5. *Closure Seal.* The cellulose band or cap serves this purpose for most products. Buyers should purchase them very closely to avoid spoilage if stored too long. For slow moving items, the use of "dry" bands is recommended. Incidentally, wet cellulose bands will not stand freezing; therefore, stock for winter months should be bought in early fall.

6. *Labels.* This is perhaps the most important component of any package from a merchandising standpoint. It is the manufacturer's identification of his product. Aside from nomenclature, however, there are several practical considerations. First, the quality of the paper—it must take and hold printing without bleeding. The "grain" of the paper must be such that it conforms to the container contour without buckling. It must handle easily in a labeling machine. It must take adhesive readily and dry without wrinkles. While many concerns manufacture their own labels, most of them are produced by companies who specialize in that business. Even the adhesive to hold the labels presents many problems, the major problem generally being that of drying speed. Temperature of application and solubility in water are also important.

7. *Folding Boxes.* For bottles contained in folding boxes, the buyer is confronted with many considerations. For use in automatic packaging equipment, it is necessary to engineer the box to the equipment; thus the construction of flaps, scores, and caliper of board are very important. These same things are not as important if boxes are assembled by hand. The buyer should therefore ascertain in advance just how the boxes will be used. Regarding printing, it is possible to make substantial savings if a solid background color is used which can be introduced into the liner of the board at the time of manufacture. Thus the effect of a two or three color job is obtained at approximately the same cost as a one or two color printing job respectively. However, such board is obtainable only for large requirements.

Before leaving this subject, I would like to record one additional thought, which is fundamental in

Bulk bags are a relative newcomer in the bulk shipping container field. Here again the physical and chemical properties of the product determine the type to be used.

good purchasing practice. Once you get a satisfactory supplier, stick to him, provided of course that his prices remain in line. The expense, both actual and abstract, of changing suppliers is often far greater than the saving realized by a lower price from a new source.

Corrugated Containers

Up to this point we have covered matters pertaining to XYZ Company's new product as it appears on the retail store shelf. To get it there, however, brings up the subject of secondary containers. For most bottled products sold in domestic markets, the corrugated or fibre box is used. I am going to give a little extra time to this subject because it is one which too often fails to get its fair share of attention.

The ideal shipping container has been facetiously described as one which would carry its contents to destination safely and then fall apart completely. Whoever said that must have been thinking of eggs. Seriously though, buying the right type of corrugated box for a given product is very important. To begin with, there is that time-honored problem of which is better—kraft or jute. For many years the jute manufacturer undoubtedly held the lead, but it must be admitted that during the past ten years technological advances have brought kraft up to a leading position. I am not categorically favoring either, because I feel both have their places. For glass bottles, I frankly consider a jute box better than kraft because of its greater rigidity. Even this is controversial, because there are many kraft sheets which are rigid in addition to possessing other desirable characteristics.

In the case of bottles, they support the box rather than the box supporting them. Bottles are inflexible and fragile, therefore rigidity is essential in order to maintain uniform cushioning afforded by the side walls and interior packing. Jute boxes tend to distort less on rough handling, although it is conceded that the kraft box, being more flexible, will resist actual rupture better than jute.

Buyers should carefully consider the true significance of manufacturers' ratings. A 175 lb., 200 lb., or 350 lb. Mullen test stamp merely defines the puncture resistance rating of the board itself. The important thing is to tailor your box specifications to the article it is to contain for transit handling of known degree.

Practical Testing

Let's get back to XYZ Company's new product. The company cannot afford to have any slip-up in getting it on the market. They have spent thousands of dollars on advertising and the dealers are all primed to sell it. At this point many companies fail to pack it adequately, with the result that dealers receive some damaged merchandise. They complain and demand credit or replacement, and a damper has already been put on their enthusiasm. Even if damage is not evident to the dealer, often concealed damage permits a package to get in a consumer's hands with similar dissatisfaction. The product is off to a bad start.

All of this is preventable. How? Just finish the job of buying containers by getting shipping boxes of the right construction in all respects. It may be good policy to *over*pack a new product at the start, just as a safety measure. Better still, establish the soundness of your box specifications by actually having them tested. First call in a reputable boxmaker and let him take enough samples of your product to make up several different types of boxes. Don't get one of each except for preliminary size checking; get at least a dozen of each. Pack and seal them in the regular way and arrange for shipment to representative points via commercial carrier. Now don't make the mistake of having them returned to you "as is" because the results of the test shipment will be lost. Arrange with a branch office or a good customer to receive them and rebox them "as is" in wood shipping boxes with plenty of excelsior cushioning. When received back at your plant, their actual condition on arrival at the test shipping point is evident.

Assuming they are all in good order, you may now go ahead with the buying of whatever style or type is most desirable. On the other hand, if they arrived in damaged condition, call your boxmaker in again and study the whole problem together and arrange for further tests on a modified type of box. In any case be sure the tests are truly representative. If still further precautions are desired, take the trouble personally to investigate any subsequent customer complaints to make sure a shortcoming of the shipping box is not responsible.

Other Package Units

Up to this point I have covered matters of concern to the buyer insofar as XYZ Company's new product is concerned. Many of the considerations presented are applicable to containers of all types. Obviously, space does not permit every element of containers to be discussed in detail, but there are still others which should receive at least a brief comment.

In addition to glass bottles, we have in the small package field a very formidable list of container types. First, let's talk about metal cans. They are made in a thousand different shapes and sizes, but the number of types is relatively small;

namely, slip cover, threaded cover, friction plug for dry articles and the tight head and screw cap style for liquids.

The same chemical characteristics of XYZ's product are applicable to metal cans within certain limits. Under present government restrictions, it is necessary to use lacquered blackplate or terneplate in place of tinplate cans for many items. The counterpart of the liner and cap problems of the bottle package are represented by the lacquer on blackplate and lead coating on terneplate. In addition, some articles require a doped seam can or one with soldered seams. Friction plug cans, for example, are risky to use if made of blackplate due to the tendency of lacquer to scrape off on the throat and contaminate the product. In any case, the product and the can must be compatible with each other in all respects. In procuring cans for liquid items this is most important, especially for solvent articles. If the contents are volatile, allowance must be made for adequate expansion by the use of oversize containers from a volume standpoint.

The next category is paper containers, such as cartons, sealed folding boxes, and bags. All three have the common characteristics of being pliable and fragile; therefore, the buyer should make allowance for this in the purchase of boxes in which to ship them. With the advent of laminated paper, metal foils and amorphous waxes, manufacturers of these items can produce containers having characteristics which were unheard of a few years ago. These likewise require tailoring to a specific product, utilizing the same methods and principles already discussed.

Glass ampules deserve a place in this discussion, although they are used as containers in very limited fields. Although there are thousands of different glass formulas, most ampules are made of standard soda lime glass. For certain products N. C. (non-corrosive) borosilicate hard glass is necessary. Ampules are unlike any other type of container in that the manufacturing processes are such that close tolerances obtainable in molded glass, plastics, and metal cannot be expected from ampules made from tubing. I would recommend that every buyer of ampules who has not already done so, take the time to visit a glass factory and learn all he can about how tubing and ampules are made. He will be more than repaid with knowledge which will make his job easier in many respects. Ampules are a made-to-order container, therefore it is not practical to generalize about them any further.

Fibre Drums

We cannot go much further without running into bulk containers. While there are fewer detail considerations than applied to the small bottle, can, or bag, the basic pattern with respect to compatibility still applies. Fibre drums, for one, are among the finest examples of modern packaging in the bulk container field. They are made in sizes ranging from ½ gallon to 75 gallons by capacity. Their tare weight to net weight ratio is probably the lowest of any rigid container now made. As to strength—well, to use a slang expression, "They've got what it takes!" If this were not true, the Interstate Commerce Commission would not authorize them as shipping containers for many dangerous chemicals such as Class B Poisons, inflammable solids and oxidizing materials.

Fibre drums are available in many different body constructions, each of which is designed for specific products. Different types of head construction are available from the several manufacturers. First, of course, is the all fibre type with slip cover or friction lid. Then there are the composite types made with wood or metal top and bottom. The tops of the metal group divide themselves by type into full open head and friction plug. Each has its own advantages of application for specific products and usage. On a cost per net pound of contents they are less expensive in both material and labor, and accommodate more poundage per cubic foot of storage space, than any other rigid container.

Most fibre drums are purchased on a so-called "nested" basis, which reduces the incoming freight charges by almost 50%. Let me give you a tip, however, on this point. Freight savings resulting from nesting may be entirely cancelled, if not more than offset, by the labor cost of unnesting and stacking at your own plant. There is no magic formula about this, because each buyer of drums has his own storage and handling conditions to meet. Buyers ought to give this matter some close scrutiny. Incidentally, assistance from your time study men and cost department will prove very helpful. In any case, don't buy fibre drums nested except to the extent it results in real, not apparent savings.

Next, we come to metal drums, which are made in a size range exceeding that of fibre; namely, 1 gallon to 110 gallons for most commercial uses. The principal types are the closed head for liquids, and open head for dry and/or viscous materials. For most liquid articles there are ICC Regulations that apply which should be checked carefully before buying. If there is any doubt about them, your traffic department or the nearest Bureau of Explosives Office will gladly assist. These same things are true for open head drums, but not to as great an extent. I will not dwell on details of construction except to point out one thing which I believe is often overlooked; namely, whether a returnable or non-returnable drum should be purchased.

Generally speaking, returnable drums should be avoided. Except for types such as stainless steel, aluminum, rubber, or very special constructions, the returnable metal drum is a costly nuisance, particularly to the receiving and accounting departments. If you must use returnable drums, I suggest that you buy the so-called heavy gauge type with I bar rolling hoops and reinforced chimes. The initial cost is high, but the greater potential life more than offsets that.

Regarding inside protective coatings, we must give much credit to the paint and lacquer industry. They have done a fine job, but I am sorry to say some of their efforts have been nullified by improper application on the part of some drum manufacturers. Heading the list of shortcomings is their failure to handle and process the sheet stock after coating in such manner that the coating is not ruptured. This can take place in several operations, but is most commonly caused by seaming rolls and swaging machines. There is only one safe way to avoid such trouble and that is by testing an adequate number of samples produced on commercial equipment before placing orders for carload lots. Another headache is sometimes encountered with open head drums which are sprayed inside after fabricating. If the heads are applied before the coating has fully dried, there will be trapped in the drum the solvent fumes which sometimes take days to dissipate. The only way around this situation is to insist that your supplier furnish odor-free drums and be sure it appears as a requirement on your purchase order.

Metal drums of all sizes lend themselves advantageously to lithographed or printed labels. If your requirements are large enough, they are fully justified from a cost standpoint and will contribute much good

will in the way of advertising in transit as well as to the user.

Wood Cooperage

Regarding wood barrels, the common slack barrel is a good shipping container, but not too many slack barrels are now being made which are as good as they were a decade or more ago. The obvious reason is that the types of wood required to make good barrels are becoming scarcer every year. A good slack barrel, however, has several virtues which do not have counterpart in either fibre or metal containers. They are more rigid in certain respects and can withstand greater stacking loads, dependent on the manner of tiering. They can be moved more readily, and for export purposes are the most desirable bulk container there is from certain standpoints.

Regarding tight barrels, we all know their best use. I doubt if there ever will be a substitute for a good whiskey or wine barrel. You may be interested to know that certain chemicals possess characteristics which make a tight barrel the only container in which they can be held. The scarcity of suitable wood for such barrels is even more acute than for the slack type.

Bulk Bagging

Bulk bags are a relative newcomer in the bulk shipping container field, particularly the multi-wall paper bag such as most cement and potatoes are shipped in. Here again the physical and chemical properties of the product determine the type to be used. By that, I refer to the seams and the style of closure. First consideration is net weight and second is whether most shipments will travel via carload or less carload. A bag to withstand the latter must generally be twice as good in all respects than is needed for solid car shipments. There is only one way to find out, and that is to test it. Follow the same procedure as outlined for corrugated boxes. Regarding closure, the wire tie is probably the most common, but the best all around is the stitched seam. This is feasible only for items which are great enough in volume to justify the purchase and operation of special machinery.

The burlap and composite burlap and/or cotton and paper combinations are preferred by many manufacturers. They are particularly suited to chemical and food products, but don't forget the compatibility angle I have so often mentioned. In this connection the main points to consider are the bonding agent and the surface characteristics of the inside liner. This is very important in the case of heavy crystalline and granular materials which cause an abrasive action resulting in product contamination from fibres. Again, testing and a close study of what the manufacturers have to offer is the only solution.

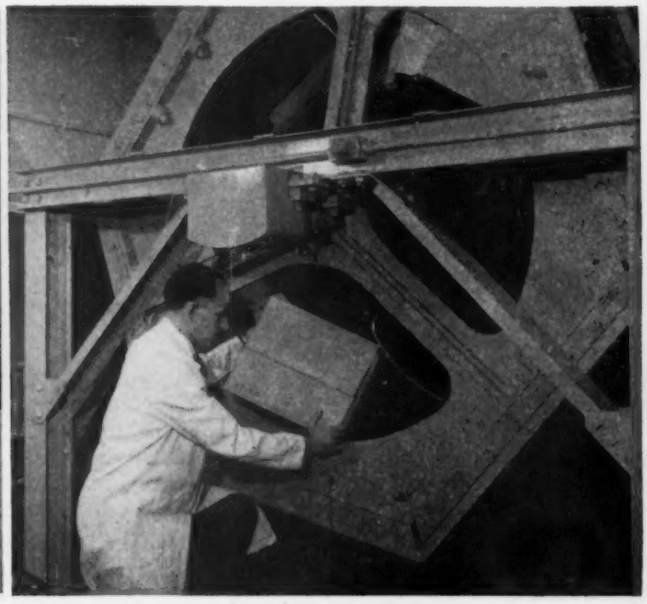
Last, but by no means least, is the wood box. While they have been largely supplanted by fibre and corrugated containers for domestic purposes, wood boxes were found indispensable for most export shipments during the war. The use of cement coated nails plus steel wire or strapping, combined with waterproof liners, produced shipping containers for war materials which fully protected the contents from the necessarily rough handling. Their almost "puncture proof" characteristics contributed largely to this.

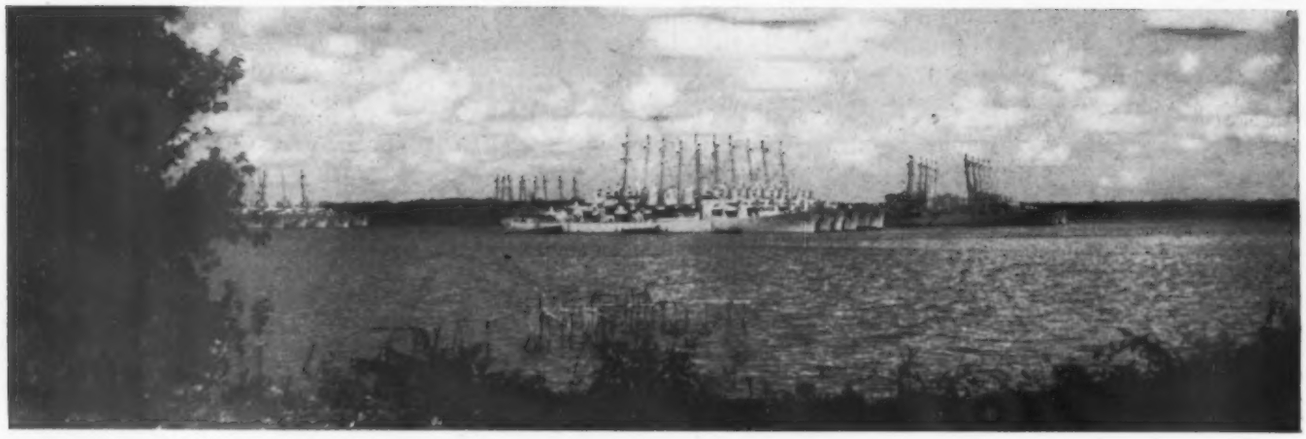
Most buyers of wood boxes procure them in shook form, which is the cheapest and best from all standpoints. It is recommended that the ICC handbook be consulted on minimum construction requirements, whether your product is a regulatory one or not. I have just one tip on shooks, and that is to suggest that they always be glued in addition to the usual tongue and grooving. By so doing, the cost of assembly and nailing is substantially reduced. Another tip which will please your storeroom people is to insist that your supplier furnish wire rather than cord tied bundles. In the case of a large shook, be sure to have a wood cleat placed under the wire to insure its remaining flat in handling.

Regardless of our experience in purchasing, we all learn something new every day. Most of this, however, is done without any conscious effort. We read it, we hear it, or we observe it. Let's go further than that by making it our own personal duty to learn more about our commodities. By so doing, we make an investment that will pay dividends to ourselves, our employers and to purchasing as a profession.

Fibre drums are among the finest example of modern packaging in the bulk container field. This Continental Can Co. 41 gallon drum weighs 16½ lbs.

"Finish the job of buying containers by getting shipping boxes of the right construction in all respects. Establish the soundness of specifications by having them tested."





Decommissioned Navy vessels ready for berthing at Green Cove Springs, Florida. If and when needed, these ships will be ready for sea duty.

THE FLEET'S IN . . . . . STORAGE

Navy supply problem goes into reverse as hundreds of medium draft auxiliary vessels are temporarily decommissioned

LEGEND has it that somewhere in the weeds of the Sargasso Sea, a large ghost fleet has been entangled. Of more recent memory is the old Liberty Ship fleet of World War I, moored in the Hudson River and left rotting.

Now another fleet is being assembled. Literally hundreds of Navy vessels of light and medium draft are begin moored to piers at Green Cove Springs, Florida.

The purpose is not to create legend, nor to permit the ships to be battered in the weather, and finally to be junked when the public forgets their cost and purpose, and remembers only their unsightly appearance. This will be a fleet ready to sail in support of the heavy fighting ships that will also be kept in readiness.

They will be the landing craft—the ships that carried the tanks; the transports that carried the men to the scenes of World War II battles. It would be easy to lyricize their part in winning the war, but to the purchasing agents and Navy supply officers who did the work of gathering materials to build the fleet and finally to supply it, it was a desperate job.

PURCHASING's Washington Editor recently visited the new Navy base at Green Cove Springs, Florida, where the ghost fleet of World War II is being held in readiness for an emergency that every one fervently hopes will never materialize. Here he saw a unique supply problem at first hand, and reports his observations for our readers.

Now there is a job to do in reverse. The ships are being put in shape to store. Eleven huge piers are under construction at which the ships will be berthed—and through a system of constant maintenance and repair, they will be kept in good operating order.

Here again there is a good story of huge construction activity—of a $13,000,000 project that will result in the largest ship berthing area in this country.

At the same time, the scene is the staging area for one of the country's major headaches. Here is where some of the most unmanageable of the war surpluses originate.

From the ships that are being made ready for storage, large tonnages of food and stores in all stages of deterioration are coming to light—some in good shape, but generally in odd lots. At the other extreme, coming out of the holds is tinned meat which must be left in open storage—because the odor is such as to make it impossible to store in a closed warehouse. There is some canned food which is in perfect condition, but minus labels, so that there is no way of determining the contents without opening the container.

Commander James H. Payne, Supply Officer at Green Cove Springs, found things much more simple during the war when he was aboard ship. Then it was the routine job of keeping a ship in supply. The very precautions which he then followed have now come to haunt

him. During the war, supplies aboard ship were so stored as to insure a balanced supply even in the event that the ship suffered damage and portion of its storage was destroyed.

To accomplish this precautionary aim, supplies had to be split up into small balanced supply stores and stowed in various portions of the ship. This, of course, meant that these broken lots were harder to keep in good shape, even though unused. Now, as each ship comes in and the load of supplies is put ashore preparatory to berthing the vessel, these small collections of supplies are disgorged from the hold, and Commander Payne has the unenviable job of consolidating like supplies, sorting them and trying to get usable food and materials back into the Navy's channels of consumption.

One of Commander Payne's problems is making his books balance. A ship comes in and its supplies are unloaded. The broken lots are almost impossible to classify, and while the Supply Officer of the decommissioned ship declares his residue of supplies, it is up to Commander Payne to translate these declarations into re-usable supplies, disposable surplus, or spoilage marked for complete destruction.

His problems are somewhat similar to those of a P. A. who has to dispose of scrap, except that Payne has a miscellany of scrap that would stretch even the most elastic of imaginations.

The big problem is tinned meat which has become rank and odorous. These he has arranged to sell to a renderer, who finds that sufficient fat can be recovered from the spoiled meats for the making of soaps, so that the transaction is worthwhile.

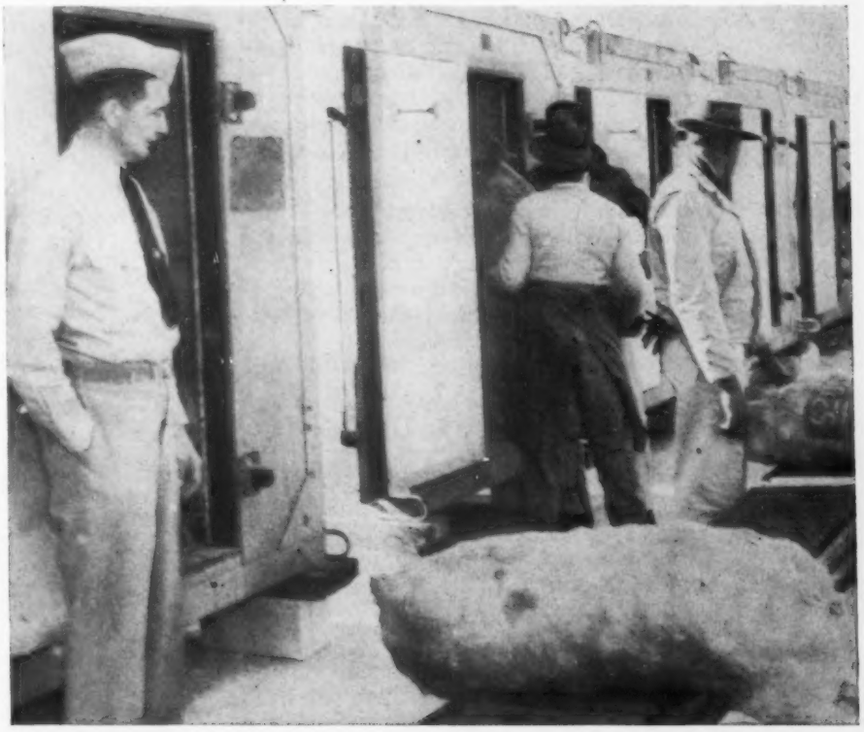
There are the wormy grains and cereals, which he sells to feed manufacturers for ingredient of animal feed.

The range of items which Commander Payne acquires runs the gamut from fine mahogany lumber, which is used for repair of ships, to a stray steel helmet left aboard a ship. In his warehouses there are cases of emergency rations. Contents may be old or of recent manufacture. On opening one of these sealed boxes, it may develop that the cigarettes contained in the package are moldy, the stick of gum beyond use —but the package of safety matches may be ready to light up when struck, the small package of sugar in excellent condition.

These then are some of the problems which the military is facing in assembling and classifying the huge bulk of surpluses.

The surpluses come from the holds of a hundred ships—some of which were newly commissioned, with their supplies in perfect shape; others have been at sea for several years, with consequent deterioration. So the cycle goes. What one man purchased with feverish determination during the period of war, becomes the disposal problem of another. Just as the brunt of wartime supply fell on the Navy purchasing officer, he has now wound up with the job of disposal.

Miscellaneous foodstuffs are taken from the holds of ships long at sea. Classified and repacked, they are headed back to the Navy's larders.



Commander J. H. Payne, supply officer, supervises the storage of potatoes in refrigerator units assigned to land duty from a supply ship.

16 REASONS WHY

THE P. A. SHOULD HANDLE EXPEDITING

1. No purchase transaction is complete until a satisfactory delivery is effected. Therefore the follow-up and expediting action required to effect delivery comes within the logical scope of procurement responsibility.

2. If the buyer's function is construed to end with the placing of the order, there is no assurance that it has been properly placed, whereas the responsibility for getting the actual delivery imposes a check on his judgment at the time when the transaction is initiated.

3. Terms of delivery are just as much a part of the order or contract agreement as are the factors of quality and price. The original delivery promise is made to the buyer and becomes a part of the contract. Policing the fulfillment of these terms should consequently come within the purview of the buyer.

4. Divided responsibility for selecting the supplier and securing delivery opens the way for "buck passing" rather than coordinated effort toward getting the desired results.

5. With expediting as an integrated part of procurement, responsibility is fixed for proper anticipation of needs and allowance of adequate lead to permit good purchasing. This could otherwise be covered up by intensive expediting to the detriment of economical buying or good vendor relationships, or both.

6. Expediting is a part of purchase scheduling. When it is retained within the purchasing function, it encourages more accurate estimating and requisitioning of needs, and avoids the confusion of conflicting demands upon suppliers.

7. Expediting is intimately concerned with vendor relationships and their maintenance. It should therefore be under the control of the purchasing department, which has primary responsibility for vendor contacts, and will in all probability have occasion for future dealings with the vendor.

8. It is simpler for the vendor to deal with one individual or department on all phases of a transaction than to have several departments involved. Since the buyer has the original contact, it is logical for him to follow through.

9. Personal contacts established in earlier stages of the order, or through continuing dealings with a supplier company, are of great value in expediting. A phone call, for example, is likely to get more attention and action if put through to a specific individual in a company, known to the buyer, and known to be the right person to give information and assistance.

10. The buyer has the greatest influence in expediting since he wields the buying power and future patronage depends largely on his good will. He can frequently enlist the interest and effective aid of the vendor's salesman in expediting deliveries.

11. The buyer is familiar with the preceding circumstances in connection with the negotiation of the order and plans for its fulfillment. He can therefore adapt expediting methods most intelligently to the circumstances.

12. Complete records of the transaction are available in the purchasing department's open order file. Duplication and possible conflict or confusion can be avoided by including the record of expediting action, correspondence, etc., in this central file.

13. The regular review of open orders, coordinated with delivery schedules or promises, permits expediting action in time to be effective rather than merely exerting pressure at the eleventh hour, when it may be too late.

14. It is important for the purchasing agent to know whether suppliers habitually require expediting or whether their promises can be relied on, to be familiar with their willingness and ability to cooperate, and how they react to expediting. All of these things help to determine their desirability as sources of supply

15. When expediting fails, it is important that the purchasing agent know about the delinquency and impending shortage, that arrangements can be made promptly for procurement from alternative sources.

16. Every really tough expediting problem is tossed back into the buyer's lap anyhow.

MORE VALUE FOR YOUR TAX DOLLAR

How centralized purchasing aids efficient municipal government by economical use of public funds to get more goods and services

• ***By J. W. Nicholson*** City Purchasing Agent, Milwaukee

EVERY citizen is entitled to the fullest consideration in respect to getting more value for the tax dollar. Although he has no choice in the matter of paying taxes, he can do something constructive toward increasing tax dollar mileage. The traveler, the renter and the solid property owner all pay taxes in one form or another. It is the purpose of public officials and employees to give the greatest measure of value in public facilities and service.

The man in the street, commonly known as Joe Doaks, has little if any conception of the functions of public administration. It appears so complicated to him that his normal reaction to problems of local administration is to feel that he can have little if any effect on them. If all citizens took this attitude, our problems would be infinitely greater, but fortunately such is not the case. We are greatly indebted to civic minded organizations and individuals who carry the burden of promoting efficiency in public administration. A public official's lot is not a happy one, and he must have a pretty thick hide to weather the storms.

Today's picture, as it relates to the affairs of a metropolitan city, presents a most complex and confusing appearance. Services such as were rendered in the days of our fathers and grandfathers were simple compared to those now considered to be commonplace, and accepted as necessary, such as programs of health, safety, recreation, playgrounds, fire prevention, vocational training, and others too numerous to mention. These all add to the fullness of life, but they also add to the tax bill.

Then there are the problems of labor, of strikes within the city service, especially in the operation of public utilities and other essential services such as garbage removal. Also in connection with the maintenance of essential facilities and services, there are serious problems because of the lack of materials such as lumber, paint, lead, electric cable, motorized equipment, etc. We also have the most pressing problem of properly housing our returned veterans and their families, which has created a very serious situation due to lack of ordinary stock materials which formerly overflowed the shelves and bins of our jobbers and dealers.

Then there are financial problems related to long term planning developments, including the determination of the amounts to be set aside in taxes over a projected period for use in construction of public buildings, bridges, airports, and other needed facilities. With prices increasing daily, estimates of the cost of these projects must be revised constantly. This has caused the elimination of one needed improvement after another, because tax income cannot keep pace with increasing costs. These increased costs, together with the costs of maintaining existing city facilities and services, have made it necessary for cities now to explore additional means of income. Suggestions that are under consideration in various American cities include installation of parking meters, additional tax on amusements, assessing a personal income tax on all who earn their living in the city, increasing permit costs, and many others. Suffice it to say that the day when the property owner can shoulder all of the municipal operating expense is rapidly passing, and additional revenues must be obtained if cities are to give the service expected of them.

Anyone who has taken the time to attend meetings of local boards of councilmen, especially those meetings relating to budgets and other financial matters of city government, has noticed how special interests request certain improvements or services without realizing the additional cost or the annual maintenance cost. No thought is given to the establishment of sinking funds to finance the replacement of worn out facilities. These pressures are put on the city fathers throughout the year, then at the public hearing relating to the adoption of the annual budget for

Address at a meeting of the New Orleans Purchasing Agents Association, attended by Mayor Morrison, the Commission Council, and business and civic leaders of the community, December 5, 1946.

In the minds of a great many people, both in and out of government, the name of Joe Nicholson is synonymous with efficient centralized municipal purchasing. For he is not only one of the outstanding exponents of this system through his excellent department at Milwaukee, which has been taken as the model for organization and procedure in many cities throughout the United States; he has also been one of the most active, sincere, and articulate advocates of good business practice in government.

As a hard working member and officer of the Milwaukee Purchasing Agents Association, past president of the National Association of Purchasing Agents, chairman of the Governmental Buyers Group of N. A. P. A., organizer and executive committee member of the National Institute of Governmental Purchasing, he has given tirelessly of his time and cooperation in helping to raise the standards of his chosen profession.

His assistance in setting up a purchasing department for the City of New Orleans, as detailed in this article, is typical of a score of similar assignments that he has undertaken in the past several years. A million or more taxpayers are the direct beneficiaries of his crusading spirit in helping them to get greater value for their tax dollars through centralized purchasing.

the ensuing year, an entirely different group of taxpayers vociferously demands a reduction in services and cost of administration. No intelligent criticism is given, as a rule; only a flat demand that the budget be reduced. In this latter group you will also find many special interests represented; they would like to have their cake and eat it too.

Scientific purchasing is a means of holding expenses at a minimum. Efficiently operated, it provides the manufacturer of industrial products with raw, semi-finished and finished materials which enter into his products, at prices which permit him to compete with others. It provides a means whereby the mileage of the tax dollar can be increased so that purchases for municipalities represent greater values in quality, quantity, and service.

The scope and responsibility of the purchasing function gives us a clue as to the factors which must be considered in efficient public purchasing. These factors are as follows:

(1) Adequate authority for the centralization of purchases must be provided. Then suitable rules and regulations are necessary, plus a system of forms to use in the purchase negotiation.

(2) Facilities must be provided for obtaining and developing suitable specifications, for the proper inspection and testing (when necessary) of purchases made.

(3) The efficient Purchasing Agent must have data and judgment to determine the proper quality and quantity of articles to be purchased, what should be stored, and what should be delivered for immediate use.

(4) The purchasing department should have control of the transfer or sale of used equipment, scrap and salvage.

(5) The Purchasing Agent should have at his command sources of supply so that responsible concerns will be solicited for competitive bids.

(6) Salesmen should be handled with courtesy and should be considered an asset to the purchasing department.

(7) The Purchasing Agent should obtain certain services which will give him information relating to markets and prices, including data needed to determine whether to buy from hand to mouth or whether to stay out of the market altogether.

(8) The placing of orders for a municipality presents many legal aspects. It is necessary that the purchasing official shall have a good knowledge of contract law and procedures. He should realize the limit of his authority and appreciate the importance of referring legal questions to the duly authorized legal counsel of the city.

(9) He should be capable of having an adequate and suitable annual budget for his department, and should be in position by reason of his knowledge of prices to assist other departments in the preparation of their budget requests.

Rules and regulations promulgated by the purchasing department should be given to all department heads for their information. A printed office manual would be helpful in this respect. This will assist other departments in understanding what is expected of them in their purchasing relationships. Every function of the purchasing department should be clearly outlined to prevent occurrences such as the following:

One Saturday afternoon during World War I, when the purchasing department offices were closed, two large crates addressed to the City of Milwaukee, weighing approximately four thousand pounds, were delivered to a ward yard, freight prepaid. The ward foreman, having received no instructions from the purchasing department as to methods of receiving goods and reporting them, stored these crates in the ward yard, anticipating that before long some one would ask for them. That time never came, and as the years went by the crates were moved farther back into the storeroom to make space for other materials.

In 1942, twenty-four years later, they were discovered by a WPA crew working on an inventory project. This project included examining, counting and labeling every piece of city owned property. The two crates were opened and were found to contain two beautiful metal plow ornaments weighing 1500 lbs. apiece, depicting the American eagle with the word "City of Milwaukee" emblazoned on each ornament. An inquiry was sent to the Secretary of the Navy, and it later developed that these ornaments had been made for the Cruiser "City of Milwaukee", which was built in an eastern shipyard during the first World War. The unfortunate cruiser apparently went to sea without this handsome embellishment; doubtless some one worried and wondered about the long-unsolved mystery of what became of the ornaments; there must have been some furious tracing and expediting and an argument about the payment. This, I believe, is a classic example of what can happen when explicit procedure for the receipt of merchandise is not properly provided. Suitable regulations are needed for all purchasing functions and transactions.

While centralized purchasing is not a panacea, it facilitates and makes possible the organization of an effective purchasing, storing, distributing, salvage, inspection, testing, and prompt payment system. The actual results depend entirely on the earnestness, ability, experience and forthrightness of those in charge of the purchasing function. The following are just a few examples of savings which have been brought about by the efficient functioning of public purchasing departments:

B. L. Gill, Purchasing Agent, City of Madison, Wisconsin, says: "I can recall a number of instances illustrative of the benefits to be derived from centralization. Some were the result of consolidation of requirements, which is the obvious and anticipated result of centralization. Other benefits followed the establishment and use of standard specifications. Still others were directly traceable to the knowledge gained from training and experience in purchasing.

"Our fire department formerly purchased brand name fire hose and seldom paid less than $1.25 per foot. We secured the approval of the Chief to solicit bids based on the Board of Fire Underwriters' specifications. The result was that we purchased our fire hose that year at less than 50 cents per foot. This represented a reduction of 60%, or a saving of $900".

Frank W. Johnson, Purchasing Agent, St. Louis County, Duluth, Minnesota, states: "At a recent meeting of the County Board, two of the Commissioners stated that the purchasing department has been responsible for saving between $30,000 and $40,000 in their particular divisions due to the purchase of a much better grade of automobile lubricating oil and grease than had ever been purchased before, under the old system. The previous price was 65¢ to $1.05 per gallon, and the present price is 45¢ per gallon. Moreover, it is not necessary to replace parts and rent equipment to do the work while county equipment is laid up for repairs. The last two items are the big savings."

Wiley M. Thomas, Purchasing Agent, City of Knoxville, Tennessee, states that his city formerly purchased liquid chlorine for water purification purposes in 150 pound containers, at 10½¢ per pound. His department found that it could be obtained in 2,000 pound containers at 2⅞¢ per pound, or a saving of $2,316 in carload lots. Specified brand motor oils were purchased in barrel lots at 72¢ per gallon; he is now buying it in carload lots at 32¢ per gallon, a saving of 40¢ per gallon. He is purchasing better paper in 10,000 lots at 86¢ per thousand instead of in 1,000 lots at $1.98 per thousand. He is purchasing pencils in gross lots at $2.40 per gross, instead of in small lots at prices ranging from $3.50 to $4.50 per gross. He has made similar savings in the purchase of specification fire hose, coal, carbon paper, inks, and hundreds of other items.

Albert Pleydell, Commissioner of Purchase, City of New York, says: "The Board of Transportation is a large purchaser of electric lamps, and uses a much greater volume than the general City contract. For the past two years, it has been our policy to combine our requirements with those of the Board of Transportation on the contract awarded by that body. Consequently, the total purchases on the contract are increased and the discount likewise increased, with resultant savings for both contracting agencies. Similarly, the central City government is a larger purchaser and user of gasoline than is the Board of Education. In 1936, at the Board's request, we furnished gasoline to the public school system on our contract, with savings to the Board of Education of 2.04 cents per gallon on regular gasoline and 1.25 cents per gallon on ethyl gasoline."

J. H. Gaston, Purchasing Agent, City of Baltimore, Maryland, states: "Through centralized buying, all cities can take advantage more closely of Federal tax deductions, which amounts to considerable saving if properly watched". He also stresses the fact that through centralized buying, cash discounts are requested and prompt payment is made in order to earn the cash discount. He recommends that the purchasing department have a control over storerooms of ample size, yet not too large or cumbersome, so that quantity prices can be obtained.

H. E. Saumsiegle, Purchasing Agent, City of Waltham, Massachusetts, states that in the purchase of garbage collection vehicles, the Public Works Department requested that they be built locally to conform to certain specifications, but after taking competitive bids, the purchase was made from a concern in the Midwest at 20% less than the price quoted locally. He expressed the opinion that had the buying not been centralized, there would have been no competition, as the Department interested would undoubtedly have followed the line of least resistance and favored a local product. In taking over the buying for the School Department, he found that the Custodian of Buildings had established a source of supply with one concern handling janitors' supplies, whose prices were extremely high without having quality in proportion. After obtaining competition, a new source was found on the basis of competitive bids that effected marked savings. Trade school hardware and tools had been purchased by instructors at retail hardware stores, but by developing competition among wholesale dealers savings from 40% to 50% were realized. He states that the use of carefully drawn specifications and full competition in the purchase of printing resulted in substantial savings, and also points out that central storehouses for supplies, tools, gasoline, oil, street brooms, ash baskets, and other commonly used municipal supplies have saved considerable of the tax dollar because these purchases can now be made in quantities at wholesale prices.

Harry F. Wagner, Purchasing Agent, City of Cincinnati, Ohio, has saved substantial amounts for that city by combining the cement requirements of the Division of Highway Maintenance with those of other departments so that this commodity is now purchased in carload lots. A similar combining of the motor oil requirements of several departments was effected so that now a single contract is let for deliveries as required by the various departments for six-month periods, with the option of extending the contract for from one to three additional six-month periods. The present contract price for motor oil is 36¢ per gallon for the same oil that was formerly purchased at 85¢ per gallon under the decentralized plan.

The City of Milwaukee has had a system of centralized purchasing since 1917. Savings average 15%, or a total annual saving of from $450,000 to $900,000 on the three to six million dollar annual expenditures for materials, supplies, equipment and service. The average cost of operating the department is less than 1% of annual expenditures. Cash discounts alone more than pay this cost.

Sellers of fire hose try to sell on brand names because of the extra profit that accrues under this type of selling. Centralized purchasing encourages the use of standard specifications. The use of standard specifications cuts the price of fire hose in half, and you receive hose properly tested by the Underwriters' organization, which will last from twelve to fourteen years if properly cared for. One Fire Chief refused to accept specification hose on competitive bids, saying he would not be responsible for putting out fires if he did not have branded hose of his own choosing. I have had the experience of having a salesman offer a substantial donation to the Firemen's Pension Fund—or to any other

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BACK TO CIVILIAN PURCHASING

An experienced buyer finds constructive aid in facing today's conditions by recalling some of his wartime problems and how they were handled

• ***By Joseph L. Ernst***
Purchasing Agent
Board of Education
Rochester, N. Y.

WHAT a difference one year makes! It takes us from an era of war, with shooting and casualties, to at least an informal peace with cannons muzzled and most of the boys back in mufti; it takes us from a year of regimentation and priorities and puts us partially back into an economy, if perhaps less controlled, somewhat confused to say the least. In the realm of procurement there are fewer rating symbols required to be placed on order forms, but also less chance of prompt shipment of goods urgently needed. The over-all urge to help under the spell of the rallying cry of "Win the War" is gone and in its place we have the let-down, the sit-down, and the knock-down and drag-out fight which stops production and helps to increase prices.

Back at my peacetime desk buying paper and pencils, books, dishwashers, boiler tubes, coal and oil, and all the thousand and one things a big city school system needs, I look back on my five years service in our armed forces and compare that half decade with the present, with sufficient time intervening to mellow any undue optimism or pessimism of those years. With a year behind me, again as a civilian, I am confronted with all the problems the purchasing agent now faces—high prices, ersatz materials, and long delayed deliveries. Sometimes I ponder whether it was not simpler to perform the functions of a procurement officer for Uncle Sam's armed forces than it is to obtain supplies and equipment today. There is also the additional problem of a shrinking budget, the bugaboo of most school systems, educational institutions, and government subdivisions; such problems as deciding whether the need justifies the acceptance of a piece of equipment on which the price has jumped 30% or 50% between the time of placing an order and authorizing delivery.

We do not always look kindly on comparisons. However, reviewing events after a sober interlude, it is seldom we cannot find something worthwhile of the past to bolster the present or help guide the future. The supply problem in the conduct of a war is second in importance only to the fighting of the battle, for without ample munitions the best of fighting men are ineffective in modern combat. Of the problems connected with the supply of troops, those of planning and procurement are of the utmost importance and come first in the sequence of activities.

A purchasing agent for a long period before Pearl Harbor, I was one of those relatively few persons who found myself during the war holding down a position in which I could make use of my experience in civilian life. As a Reserve Officer of twenty years' standing, I was called into the Army in January, 1941, to attend the Army Industrial College —the eqivalent institution for logistics to the War College for tactics— and following the completion of that course was assigned to Procurement Planning in Washington. In the summer of 1942 I was ordered to Australia and became an assistant to the General Purchasing Agent for the Southwest Pacific Area. The officers in the Office of the General Purchasing Agent (GPA) were assigned to the United States Armed Forces in the Far East (USAFFE) and on the staff of General MacArthur. Therefore, my comments will treat on the problems of procurement in Washington and in the Pacific Theater, pointing out those good features in the method of purchasing our supplies and contrasting them with present day problems.

Then and Now

I have been asked many times whether I am getting back into the swing of things and whether my present job does not seem tame compared to what I had been doing during the war. My answers have been to the effect that, except for adjustments as to quantity and price, there is no fundamental difference between buying supplies for the army and for a school system or for an industrial plant. The objective is the same: to have the goods on hand when needed and in the quantities required. There are usually, today, obstacles and pitfalls in the accomplishment of this purpose: perhaps price, if the budget is low: sometimes delivery, especially in a sellers' market. Shortages and substitutions, escalator clauses, and strikes, are other problems of the buyer today. To a greater or less degree we had to overcome the same or similar obstacles, and I am going to tell you how we did it.

In my case, I am probably now buying in value only as much in a year as the General Purchasing

Col. Ernst, while serving as Assistant to the General Purchasing Agent for the Southwest Pacific Area, in Australia. He was awarded the Legion of Merit medal for his services there.

Agent in the Southwest Pacific ordered in a day. Sometimes I think it is harder to operate on this scale in the present than it was in the years 1942-45 when we had the power and influence of the United States behind us and the commanding figure of MacArthur to back us up.

We are either apt to think of government buying methods as woven with reams of red tape or to grouse that the Army and Navy had no respect for money and brought recklessly and extravagantly, throwing all control out of the window. The truth is, for the most part, between those two extremes. War is waste, make no mistake about that, but we had many able men in the Service of Supply whose first thought must of necessity be to obtain the goods at any cost but who were sobered with the thought that Uncle Sam should get at least a good run for *your* money. I knew many conscientious and able officers and civilians who expected and saw to it that the United States received fair value for dollars expended for munitions. True there were the usual number of misfits, but in a force numbering fifteen million one must expect the usual percentage of incompetents, chiselers, and nincompoops. "The evil that a man does lives after him, the good is often interred with his bones." There is more publicity given and attention paid to failure than there is ever praise for deeds well done.

A Coordinated Program

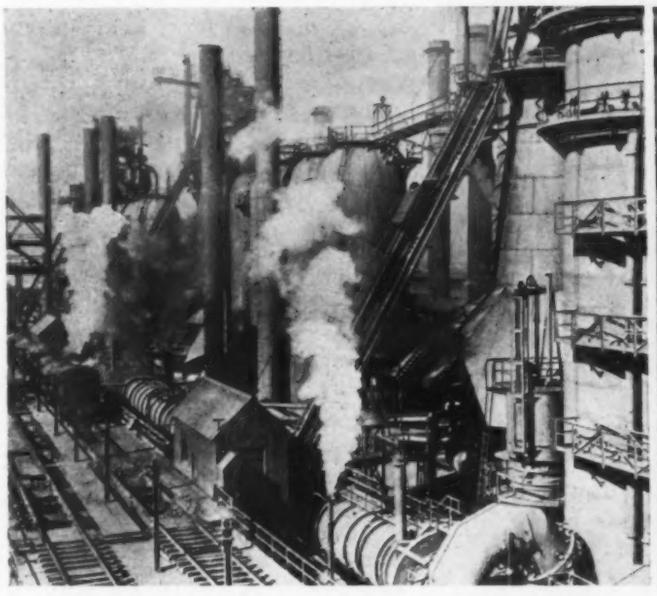
In far off Australia we were so far distant from Washington that we operated much on our own and set up systems of procurement to meet the needs of the situation. A General Purchasing Board was authorized, with the General Purchasing Agent as chairman and operating head. The GPA in the Southwest Pacific supervised all procurement for our Army, Navy, and Air Corps, and represented the United States Armed Forces in transactions with the Australian government from which we received so much on reverse Lend Lease.

The General Comment

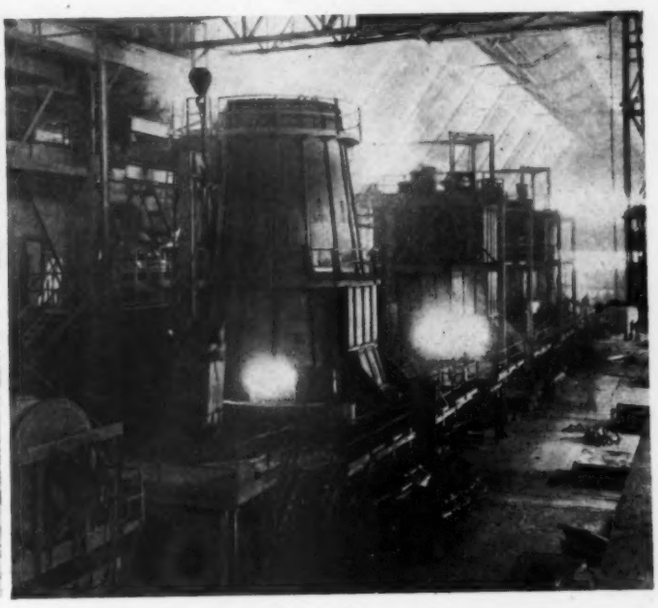
When first set up, the general comment concerning the GPA by the Procurement Officers of our several supply services was that it seemed simply another bureau to impede rather than aid them in their duties. However, it was soon shown to the satisfaction of most of those concerned that cordination of the procurement effort paid dividends and eliminated a great amount of competition among the services. The Australian officials had only one office to look to for information and guidance. Furthermore, the Office of the GPA was a stabilizing influence. In war there was too often a complete turnover in personnel. Officers in the procurement branches of the several services were literally changed over night. On the other hand, the GPA personnel was stable and most of the officers remained with that group throughout the war. This made for continuity and stability and built an experienced organization that held the confidence of our top Army and Navy command and of the Commonwealth officials.

This organization functioned smoothly and, in my opinion, proved that coordinated buying can be not only practical but highly efficient as well. Some of our large industrial organizations with plants scattered over the United States could take a leaf from the records of the GPA in the Southwest Pacific and build on the principles used by our armed forces in Australia. Whether we have a unified Army, Navy, and Air Corps Command or not, there seems to me no good reason why we should not have at least coordinated purchasing among our services during peace time. If the plan worked in a foreign country during the stress of war, it should prove not only workable but valuable under normal conditions.

Briefly, the way the plan operated in the Pacific was this. The various services presented their orders (Con-



Steel from the furnaces of Broken Hill Pty. Co. Ltd., played a decisive part in halting the advance of Japanese forces.



Large open top furnaces, three electrode types, are used in the production of ferro-alloys.

(Photographs by courtesy of the Australian News and Information Bureau, New York)

The paper industry in Australia comprises large and modern facilities, chiefly located in Tasmania.

tract Demands) for supplies and equipment to the GPA who in turn, after listing and checking, processed them with the appropriate Australian agency (Department of Supply and Shipping, Ministry of Munitions, Department of Commerce and Agriculture) for procurement. Questions pertinent to quantity, specifications, samples, etc., were raised by the GPA with the services so that when the Demands went to the Commonwealth officials they were clear, concise, and provided the necessary information.

Where two or more services were ordering the same or similar items, one of the services was given the responsibility of providing the others with their needs—for instance, the Quartermaster was responsible for all foodstuffs and housekeeping items, the Engineers for all construction equipment, etc. To expedite small and urgent purchases, particularly in the field, the services were given the authority to place orders up to $1000 in value without reference to the GPA.

Need for Controls

This dispensation at times brought some abuses, especially when the Inspector General discovered certain services placing several concurrent orders for the same item, each order say, at a value of $990. These cases were rare and usually were the result of the desire of some service procurement officer to make a showing or attempt to "beat the system." In the few instances where abuse crept in, it was found that, while the particular service may have benefitted temporarily, such an overzealous officer really in the end caused more trouble and upset the smooth operation of the Commonwealth's economy and jeopardized the over-all procedure.

We had at least one outstanding example of what unrestricted procurement could do. In the early months of 1942, before the Office of the General Purchasing Agent was set up and before Australian controls were operating smoothly, one of our procurement officers purchased practically all of the paper available in Australia and contracted for enough more to absorb the mill capacity in the Commonwealth for the coming year. On the face of things, that act might have been considered far-seeing, but when one considers that Australia, even with several modern and efficient paper mills, produces less than 50% of its normal requirements and imports the balance, this action on the part of the United States forces was frowned upon, and for the next three years, whenever we needed any paper items, we were constantly reminded in no uncertain manner of this cornering of their market. Eventually everything worked out in a satisfactory manner, but I cite this incident to show that uncontrolled purchasing sometimes can do more harm than the momentary good it accomplishes.

Considering the item of paper and the tremendous quantities of it required and used by the armed forces, some of it red in color, brings to mind the comment attributed to Field Marshall Montgomery. At a conference some time in 1943 he is reported to have said, no doubt with a twinkle in his eye, that the war would of necessity have to be over by 1947 for by that time the armies and navies would have used up all of the available paper.

Price Factors in War

During the first year in Australia, 1942, we were alerted to be price conscious but, after a few months' experience, the matter of price was left to the Australian government and we were charged on reverse Lend Lease, the same amount for supplies that the Commonwealth itself was paying. The various Ministries awarded contracts at frequent, regular intervals, and invited our forces to send a representative to sit in on the meetings. On the basis of this arrangement I regularly attended meetings of the District Contract Board of the Department of Supply and Shipping and the Department of Commerce and Agriculture in Sydney, and at such meetings the agenda consisted of the Contract Demands for which the Boards were ready to let contracts.

Similar Boards functioned in the other large industrial centers of Melbourne and Brisbane. In addition to the regular Board members, representatives of the Australian Army, Navy, and Air Corps, and the United States forces were present. As any questions came up relative to the particular demand under discussion, the representative of the force involved was called upon for the desired information. At these meetings price, quality, and delivery were considered. Naturally, as happens even in ordinary business transactions, price was not the only consideration, particularly when delivery, performance, and quality were the important factors.

A word as to price in Australia may be of interest. Wages and the standard of living are lower than in the United States. Australia, since World War I, has increased her secondary industries but with an over-all population of only 7,500,000 people in a country the size of the United States, her productive capacity is low, measured by our standards. However, some of her industries are planned on a very modern pattern. There was nothing

that her manufacturers were not willing to tackle—in some instances we supplied the know-how and in others furnished the necessary machinery. Her factories made jigs and dies, and in time our needs were sliding off the production lines.

When it came to food, and it is well to remember that 90% of the foodstuffs for our troops in the Pacific came from Australia and New Zealand, prices were considerably lower than corresponding costs in this country. Australia, the world's largest wool market, turned out blankets for our troops and at a cost to us of $2.64 on reverse Lend Lease as against a price of $7.67 for the same type of article in the United States. When it came to other manufactured items, where large quantity affected cost, our production lines in the United States turned out products at less cost than their counterparts in Australia.

Working With Civilian Agencies

Many things in the Commonwealth were in short supply, manpower and productive capacity limited, so that controls were very much in effect. There was the Controller of Leather to be dealt with, the Controller of Paper Products, Controllers of Rubber, Lumber, and Office Equipment, the Director of Manpower, and many others. We do not like regimentation here and we did not like it there, but in emergencies efficiently operated controls are not only advisable but necessary. As an example, the Controller of Leather would request us to furnish him with a tabulation of our needs for shoes for a year. He would obtain similar information from the Australian forces and from the British Navy, when it arrived. To these would be added the minimum civilian needs. Offset against these figures would be placed the potential hide production and the shoe manufacturing and tanning capacities. With the complete picture before him the Controller would allocate not only the quantity of shoes but the plants which would produce our needs.

In general, it was the opinion that the various controls were quite fair in giving the United States forces their share of the available total. I bring this matter up for two reasons: first, to show that we were not the only country where controls were in operation and, second, to show that intelligent purchasing coordination can bring to a problem, where allocation is necessary, a reasonable over-all picture of requirements.

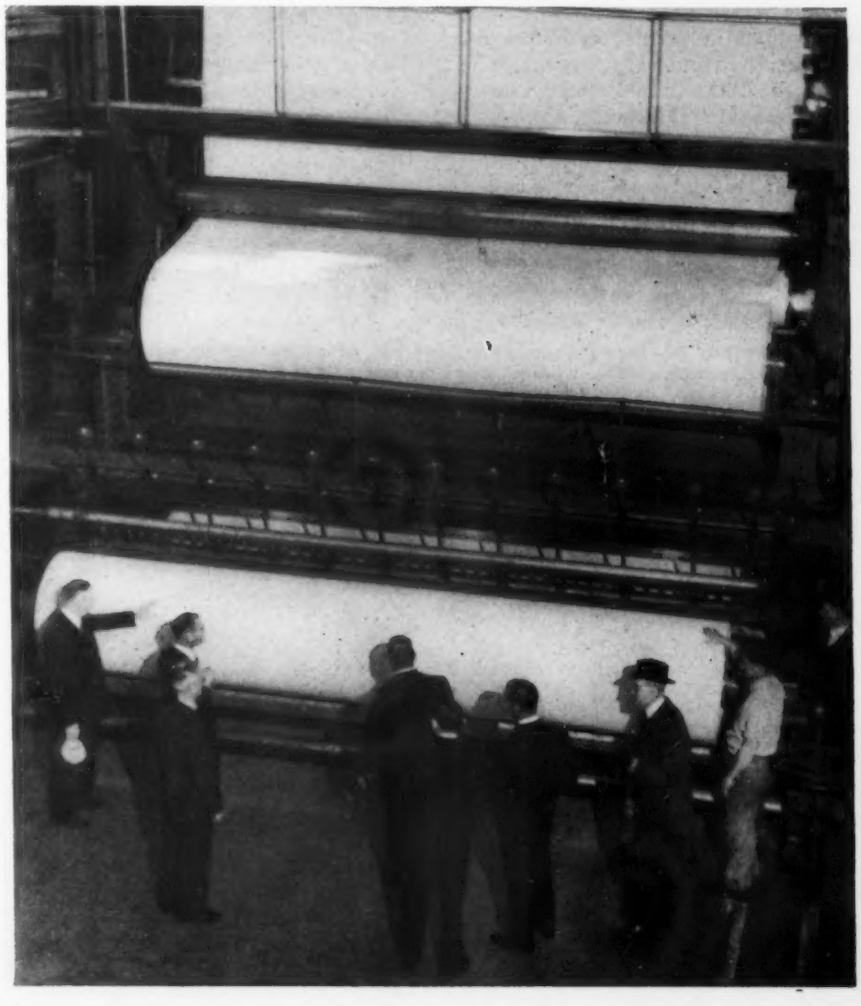
Another interesting sidelight on purchasing for the armed forces and a consideration that we might think of here, if we really cordinate purchasing for our combined forces, is the fact that the civilian government agencies in Australia, as mentioned above, took over full responsibility for procuring needed supplies and equipment for their armed forces. Perhaps there is a thought in this for us. If we set up a coordinated purchasing agency, it might well be staffed by trained civilians as an operating group with accredited representatives of the service as advisors.

Resourcefulness and Substitution

During the war, and even now, industrial and commercial buyers used and continue to accept many substitutions, but when it came to improvising, nowhere was this more necessary than with the armed forces in the theaters of operations. If you could not obtain what you asked for, you used the nearest thing to it or made something else do. In a country such as Australia with limited producing capacity and a lack of sufficient raw materials or components to meet the huge demands of the armed forces superimposed on its normal economy, many things were gone without.

As in the United States nearly all manufacturers went all out on war production. Our present day shortages in the United States echo to me a familiar sound—for lack of some ingredient or some small part the finished product cannot be produced. "Down Under" in 1943 and 1944 the lack of some one material held up the whole order. Tire manufacturers in Sydney and Melbourne could not reach their peak due to lack of manpower, the necessary canvas, and carbon black. Paint manufacturers, who turned out an excellent product, were frustrated

Australian paper production was of tremendous importance in helping to meet military requirements.



due to lack of lead or oil. To overcome these deficiencies, the Office of the GPA was given the responsibility of screening Australian requests for critical materials from the United States on Lend Lease. But approving such requests in the interest of national emergency was one thing—the next was the necessary transportation to move merchandise from the wharves of our Pacific Coast ports to Australia, and such facilities were woefully lacking.

With all the resulting delays, improvising or accepting a substitute became the rule rather than the exception. The alert purchasing officer in Sydney or Melbourne had the same responsibilities, but perhaps more irritations, than those who served in a similar capacity here, and in addition probably sensed that he was nearer the scene of action. While Guinea and the Philippines are thousands of miles from Sydney, they seemed relatively close with planes making regular trips to and from the Australian continent.

Emergency Requirements

We talk these days of the urgency of an order and how necessary that the goods be delivered at a specified time. However, one felt this necessity more keenly during the war. If a refrigerator ship were leaving Sydney at midnight on a given date, it was absolutely necessary that the food for the boys up north be on that vessel when it weighed anchor. Requisitioned weapons, ammunition, or medical supplies must be aboard or some American soldiers or sailors might die as a result of "too little, too late."

You knew, too, in those days, if requests for the procurement of supplies or equipment carried certain symbols, that the matter had highest priority and that the date of fulfilment meant what it said lest perhaps some move or planned expedition might fail for the lack of necessary munitions. The island hopping campaign of General MacArthur was predicated on the necessary supplies of food and ammunition and had they not been forthcoming from Australia our march to Tokyo would have been much longer delayed.

It was not infrequent that a cable would come down to SOS headquarters from General Kenney's Air Command stating that a plane would be in Brisbane or Sydney the next day and would return to Guinea immediately, with the order that a particular item or many items be furnished *at once*. No inveterate woman shopper after a bargain worked more intensely than the officer who was given that requisition to fill and, to the credit of those responsible, let it be said that such a plane messenger seldom returned to his command without his order being complete and his mission satisfactorily fulfilled, even if certain substitutions had to be made.

There is a decided let-down today that we did not have a few years ago. There may be inconveniences these days if goods cannot be obtained and even monetary loss if the manufactured product cannot be put on the market for the lack of one simple part. But back in 1942 and 1943 in Australia and elsewhere, if we did not obtain certain items, not only the lives of our fighting men might be in jeopardy but even the safety of our country. There was no letting down then—every possible avenue was explored and every contingency exhausted. The tension was high but so were the stakes.

Nails, to take a common item, were as scarce in Australia during the war as they are in this country today. The demand then was, not as now for use in the construction of civilian homes, but, among other purposes, for the building of barracks and Army and Navy depots both on the mainland and on the islands to the north. Many times the familiar couplets starting with "For want of a nail" and ending with "A battle was lost" came to mind as the seemingly unending demand for nails was ever before us. Australia has some large and excellent blast furnaces, rolling mills, etc., and their product was allocated to the last sheet and nail. Steel and iron sheets were used for so many things, for the construction of warehouses in the north, for ash cans and drums, and the hundreds of other uses, that it was necessary for all requirements to be carefully passed upon by a Board, to weigh the importance of all demands and allocate the available tonnage, not only to a particular service but for a specific project. Someone had to decide whether it was more important to have shells or drums or huts. So much was involved that the GPA soon assessed all requests and brought our own services into line to be sure that reasonable and not "astronomical" demands would be made.

American procurement officers found it advantageous to work closely with Australia's fine woolen industry, one of the Commonwealth's leading natural resources.

Special Services and Standards

The last statement recalls to mind the fact that some of the requirements of our forces seemed quite excessive and out of line. The Army Exchange Service and our Special Service section requisitioned items to be sold in our various post exchanges and for the recreation and welfare of our troops, respectively. Such things as mirrors and money belts were asked for by the tens of thousands and athletic equipment in quantities way beyond what Australia could produce. These requests were all based on Tables of Allow-

ance with additional numbers added to take care of all our installations, far flung and widely distributed from the mainland to the Philippines. For items such as these, we could not exert the same pressure on the Australians to furnish as we could on the absolute essential munitions of war.

Equipment from the States

Much of this type of equipment, if we procured it at all, came from the States. The "Aussies" knew but little of baseball, so were at a disadvantage in furnishing us bats, balls, and gloves. However, aside from bats, they made a valiant effort in helping us get equipment for our great national sport. The gum trees of Australia did not produce wood of the right fibre for our bats and we had much difficulty with splintering. Our boys did not take kindly to cricket, but when it came to tennis or soccer we could obtain a reasonable percentage of our needs. Before the war was over the "Aussies" were playing baseball to a considerable extent and apparently liking the game.

We had not been in Australia very long before we found that their standards on many items were different from ours — this was quite noticeable in requirements for the forces. The Australian Army's blankets, canvas bags, mess kits, cutlery, to name only a few, were different in size and design from ours. It soon became evident that a greater degree of standardization of equipment for their forces and ours would be highly desirable and would help production. Our services reviewed their specifications and revised them in many instances to meet the needs of warfare in the Pacific. In some cases the Australians adopted our specifications and production increased. Machetes, those very necessary and useful implements, used so much in the jungles of Guinea, were standardized for both forces, based on research and the experience of the troops in the islands.

Thus that important factor of standard "specs" so desired by most purchasing agents in civilian life played a major part in our efforts in the field during war. Among our own services, the Army, Navy, and Air Corps, considerable progress was made in standardization and, if this aspect is carried further, peace time procurement for the services should be simplified and costs lowered.

Wool is closely graded as to length of staple, spinning quality, color, condition, and other qualities.

I made the comment that my first service assignment after the Army Industrial College was in Procurement Planning, previous to and for a short time after Pearl Harbor. Planning of sorts had been set in motion by each supply service following the passing of the National Defense Act after World War I but, because of skimped budgets, funds were not available to do any complete job, neither was there much attempt at coordination among the services. Methods of procurement varied in the different supply branches, some, as Ordnance, established offices in various zones of the United States and these offices changed from planning to operating immediately after the declaration of war. Other services centered their activities in Washington and never did decentralize purchasing. The zones used by the services were not identical either in number or boundaries. The comment was made after war started, in connection with one of the supply services, to the effect that its planning program was the best of the lot but when the emergency came it was used the least.

Lessons of Experience

Several reasons stand out in my mind for the failure to put to the best use the procurement planning information gathered regarding our productive capacity in the years between World War I and II:

1. The lack of funds to do the job the way it should have been done.
2. The lack of sufficient trained personnel to accurately plot the picture.
3. The lack of coordination among the supply services on planning and procurement procedures.
4. The constant shifting of officer personnel and the lack of interest on the part of many for the job.

These shortcomings applied not only to the planning program but were reflected also in the resultant procurement set-up. They might well be "Stop, Look, and Listen" signals for the future. If, in the interest of national preparedness, we are to have a procurement plan for any future need, in case such emergency should arise, we could well profit from the lessons of the past in order to build constructively for the future. My comments concerning coordinated buying for our armed forces apply equally to any procurement planning in the years to come.

We in the armed services had problems, tremendous problems, to face in the procurement field in Washington, in London, in Australia, and in other strategic points. However, these problems did not apply solely to the supply services of the armed forces. The civilian governmental buyer and the purchasing agent for large and small industries had his share of troubles. Many of the headaches of the war years have disappeared, but new symptoms engage the attention of the present day purchasing agent. Perhaps some of the same formulas that helped solve the war problems might be used to help cure those of reconversion.

OUTSIDE READING FOR THE BUYER

●

By Grey Leslie

The beginning of every New Year brings with it a round of new resolutions. Some are old resolutions that were adopted with high courage and firm determination in previous years, but for reasons of expediency, distraction or downright laziness were allowed to lie dormant and wither. They seldom die; they seem to revive with each new year like hardy perennials.

Purchasing Agents are like most people in this matter of making New Year Resolutions. To them the hardiest and most persistent resolve seems to be the one concerning the reading of more books on subjects specifically pertinent to the business of buying and, when time allows, on the broader subjects of general business administration and executive functions. The urge is stiffened by suggestion and advice from all quarters. By devoting more time to wider reading, they are assured that they can increase their usefulness to their organizations. Implied in the material benefit, there is, of course, the added satisfaction of an enlarged viewpoint and the pleasure inherent in that.

Condensed books, digests, anthologies and short-cuts of every kind, are all parts of a pattern, constantly reminding us that we are in an age of acute specialization. Never was there a more urgent need for purposeful, thorough and completely digested reading. There is no one of us who is not searching for some steady base from which we may intelligently appraise the swirling currents of thought eddying around us.

Since Purchasing Agents are notorious for their complete absorption in their work, they cannot afford to be prodigal of their precious reading time. Therefore, they find it necessary to be highly selective—almost exclusive—in the choice of their extra-curricular reading matter. They also have an analytical turn of mind that prompts a keen appraisal of values.

The "How to" Library

That brings us to an examination of books and general literature normally expected to be interesting and instructive to Purchasing Agents. In an effort to give immediate force and purpose to one of my own New Year Resolutions, I bought a few books that attracted by their enticing titles and their enthusiastic endorsements. Here, I thought, I could find a neat little package of concise information on the subject I wanted. Here, I felt I could learn how other people tackled certain puzzling problems and solved them. I have culled over countless publishers' catalogues of so many books bearing the title "How to—" that I have come to label them the "How-to-do-it" type. The vast number and bewildering diversity of publications of this class are truly staggering. One wonders how there can possibly be any failures in any vocation or avocation in life with all of this instruction and advice so readily available and at so reasonable a price. There are "How-to-do-it" books on every conceivable subject, topic and problem that ever confronted mankind. The range is encyclopedic—truly from the cradle to the grave—with "How-to-do-its" for the intermediate period covering every known activity.

The prevailing and unvarying theme is "Success". There are mountains of these books whose authors indulge in a blind worship of their abstract deity. Unfortunately, I have found the great majority of books that allegedly tell "How to Succeed" in everything and anything, have been written by people who have not even succeeded in writing a book.

They are addressed to all ages. The young, active and athletic are beguiled by "How-to-do-its" on the development of muscle and stamina; the older and more sedentary are offered "How-to-do-its" on everything from deferring senescence to finding hobbies. There seem to be no subjects or activities within human comprehension that are not written about in the "How-to-do-it" fashion.

The authors profess to tell people how they may succeed in anything they undertake, whether for business or recreation. They would even make recreation a business. How, if a person likes dogs, he may succeed in operating a kennel; how, if a person is mechanically inclined and enjoys the simple relaxation of tinker-

ing, he may succeed in becoming a skilled machinist; or even, if a man happens to be a tea-merchant, how he may become an international yachtsman. TheHoratio Alger books of our boyhood days contained more sense. At least they expounded an ideal of the industrious and honest apprentice. The stories were of boys, who by thrift, study and hard work became industrial leaders or statesmen. To a mature reader the Alger tales may seem somewhat silly, but at least they were manly and contained a modicum of historical experience. The general run of the modern "How-to-do-its" contains hardly a germ of idea and scarcely any real applicable meaning.

Two Ways to Succeed

It should be obvious to any literate person that in any decent effort there are only two ways of succeeding. One is by doing good work and always trying to do better; the other is by cheating or conniving or doing things that certainly should not be written about. If you are running a foot race, you either try to run faster than your competitors if you are honest, or you pretend that you have beaten them; by elbowing, tripping, beating the gun or stretching the tape, you may win, or fool the judges that you did. You may want a book about bridge. If you want to succeed at bridge you either learn to play the game well, or learn to mark the cards; you most certainly don't want a book that tells you that running a race is running, or that games are won by winners.

If many of the writers of the "How-to-do-it" books would say anything about success in foot racing, they say something like this: "The contestant in a foot race must have a clear objective. He must have an impelling desire to win. He must forego any sentimental feeling for the less accomplished; he must remember that foot racing is distinctly competitive and that the laurel of victory always goes to the best trained." Or, in the case of bridge-playing, the stimulating advice would be along these lines: "It is always necessary to shun the error of allowing your opponents to win. You must have grit and determination and cultivate the will to win. We live in an age of hard realisms —science has proved that in any contest, if one side does not win the other side will."

This kind of instruction and advice might be stirring and wholesome to adolescents; but I am bound to confess that if I entered a foot race or wished to improve my bridge game I would prefer some honest little book with a forthright title that told me something of the rules, the drill I must practice and the kind of specific application necessary for improvement.

Most of the "How-to-do-its" concerning the serious business of the development of administrative or executive ability, contain the same sort of drivel. Many are unintentionally ludicrous and appear to be addressed to people who are expected to possess no more than childish intelligence.

My chief complaint about most of the "How-to-do-it" books is that they claim to say something positive and do not. Therefore, in my opinion they are sold under false pretenses. They profess to initiate the reader into a kind of occult, limited society of persons who pretend to know the magical secret of "How to do" something, "improve" something, or "develop" something, when it is not really a secret at all. Most of us have legitimate ambitions and an impetuous yearning for such knowledge that will help us attain them. There is no secret about our objective; but there is a sincere desire to learn how and by what honest means we may reach it.

Success is the Exception

The authors of this class of books write with an obsequious, an almost austere reverence, of people who were significantly successful in amassing huge fortunes. The success so profoundly lauded might be far less agreeable or attractive if we occasionally recall the sordid history of some tycoons who always placed self above service. We know something of the chicanery, craft, and often gross inhumanity, that made some fortunes. It is impossible, therefore, for most of us to join the paeans of praise to a mystical blind Moloch that is accepted with such awe and respect and worshipped as something possessing divinity—the thing that William James, always a cultured and temperate gentleman, was angrily moved to name "the bitch-goddess Success".

Success is a broad and bewildering thing. It appears simple, frequently unenviable, often ugly, but it is by no means easy to analyze. The story of a really successful person, in the decent sense, often represents a whole life or a large portion of a lifetime, and would require a searching and candid biography to find out the root and reason of it. Given intellectual integrity and a consuming intellectual curiosity about success, any malicious invention or dishonest selection or distortion must be ruled out because an honest aspiration can never be safely based on fabrication. If one stops to think of it there are as many genuine heroisms in failure as there are in success. The *Song of Roland* is the recitation of a failure, but the heroisms it portrays are as inspiring as the heroisms of any success.

Balzac's keen penetration of the nuances of success urged him to say, "To worship the fool who succeeds and not to grieve over the fall of an able man is the result of our melancholy education, of our manners and customs which drive men of intellect into disgust and genius into despair."

Reasons for Failure

As a matter of fact, a close study of formally organized efforts in human history (partnerships, companies, corporations, associations, societies and what not) shows that success is the abnormal, not the normal, condition. What are noticed are the successful survivors among innumerable failures. Naturally, it would be stupid to clutter up our minds with the record of the failures. We want to know about the successes. But we might add to the list of the successes if we catalogued some of the basic reasons for the failures.

Anybody writing about success should be reasonably expected to give his definition of it. Without some sensible definition of what is meant by it, it would be perfectly logical to say that a thief who avoids detection is a success because he succeeded temporarily in escaping punishment, or that a suicide is a success because he succeeded in killing himself. It is the insensitiveness or callous indifference to the moral implications of success that is so disappointing in so many of the "How-to-do-it" books that so egregiously acclaim it.

It seems to me that the disappointment in these books is made more acute because they fail to respond to a reader's wholesome urge to catechise himself. A "How-to-do-it" addressed to people in business, especially to Purchasing Agents, should, I think, provide some methodology of self-questioning that would expose the extent—or lack—of knowledge of current qualified opinion on the puzzling questions and difficult problems confronting industry and management in all phases and at all levels.

Fortunately for me, my resolution weathered the disappointment

of these skirmishes with the "How-to-do-its". I have found a number of books that are in refreshing antithesis. In their serious presentation of factual experience there is sustained mental stimulation—a practical, easily understandable method of catechizing. They have already paid substantial dividends in profitable application by the direction they offer and in highly satisfying and pleasurable reading as well.

One such book by H. Frederick Willkie, Vice President of Joseph E. Seagram & Sons and brother of the late Wendell Willkie, is entitled "A Rebel Yells". This book will sting the reader into action in the self-catechizing method I have mentioned. The accent throughout is on effective self-analysis and the processes for achieving it. Written in vigorous down-to-earth language, it draws upon years of wide and diversified experience with executives and workers, here and abroad.

It is a forthright job, critically and constructively examining and explaining the specifications for executive leadership. It shows the ways and means of discovering, cultivating and putting to use, the potentialities of the individual in industry. It enables the reader to get outside what Willkie calls the "ritual" of an occupation, how to make the job itself a part of a wider education that is bound to generate new ideas. It is an introduction and an alluring invitation to a new kind of industrial thinking.

Willkie never indulges in the use of what I call "rubber" words. He defines exactly what he means with clarity, and gives real sense to his captions. In his capable hands words like incentive, initiative, social responsibility and human potentiality are returned to something like their pristine significance. As he uses them they become vehicles of thought rather than mere euphonious slogans.

In a section entitled "Vision for New Industrial Frontiers", Willkie has succinctly sketched an historical background of modern industry that will invite the reader to cultivate a keen interest in historical perspective—an interest that will point up his opportunity to play a dynamic part in the present industrial age and will equip him for a responsible role in the exacting times ahead of us.

Social Responsibility

Modern industry and mass production have replaced the traditional crafts and the rigid apprenticeship system. For centuries they were carried on in small establishments or within the compact framework of the old-time guilds. With all of the obvious benefits to civilization, this evolution has imposed new and formidable social responsibilities upon industry that it must accept if it would survive here or anywhere else. Rightly or wrongly, modern industry has long been so absorbed with the profit motive that little if any attention has been given to the new social philosophies that were engendered by the expansion —the almost explosive expansion— of the industrial era.

Willkie spells out these social responsibilities and the reasons for their coming into being. He clearly outlines the problems they pose and offers practical solutions to which *we must actively contribute as individuals*. Industry is recognizing, belatedly perhaps, that it can encourage and contribute to the development of well-rounded social individuals who because of their broad cultural, economic and sociological viewpoints, are able to add materially to the sound structure of American Industry. The motivation may not be as selfish as the profit one; but it is not entirely unselfish or altruistic either, because industry has come to know that the well-rounded executive contributes most to his individual industrial organization. Therefore, industry is gradually awaking to the desirability of training employees who may qualify as executives.

Willkie's book offers a synthesis to people who would do the training as well as to the candidates. He offers it without any sermonizing, with no exhortation for some exhilarating activity for the abstract benefit to humanity. He presents it as a commanding summons for *individual participation* in an exciting and desperate struggle for the survival of an economic system under which we have progressed and, if we have any sanity, would perpetuate and improve.

Willkie has drawn heavily upon his wide personal experiences with executives and employees. His book has an indefinable but reassuring air of authority. It will warm up the engines of the reader's thinking machine—make him impatient to open the throttle to get under way on a new road of thought. It will enable him to interpret the beacons intelligently and to chart a journey that will immeasurably advantage him educationally; it will equip him to assume with confidence the opportunity of leadership in confronting new industrial frontiers.

Another book that proved of immense value carries the title "Functions of the Executive", by Chester I. Barnard. This was intriguing to me because of, what I considered, its ambiguity. After reading the preface (N.B. there are many pleasant surprises in this habit) I was interested in the author's rather unusual suggestion that some readers might find it desirable to begin with the second half of the book at Chapter Ten. I did. I resisted the temptation to read the first half of the book until I had finished the second half. Among many things learned from this reading, and they are considerable, I am convinced that the author has used a technique that will ensure the careful reading and many re-readings of his entire book from start to finish. Mr. Barnard, the author, is not a pedagogue by profession, but he possesses a talent for teaching that could well be the envy of many professionals in that calling.

The Executive Function

Here is a book that, I believe, will be of intense interest, and certainly instructive to men and women in administrative and executive positions and to those who sincerely aspire to attain such posts. Frankly, the book is not easy reading; it will demand close attention. I believe the author deliberately designed it in that fashion as a test of the sincere interest of the reader to thoroughly explore, as he did, the genesis of the functions of the executive. The mental discipline and concentration required are in themselves an education and will be more than adequate compensations for whatever application is called for.

In describing the function of the executive, Barnard has not taken anything for granted. He analyses and defines every term he uses. He traces, painstakingly but never tediously, the nature of organization, the processes of organization, the arts of organization, and the *sense* of organization. He delineates the essential requirements of executives and potential executives to make any organization effective and efficient.

The book is filled with surprises. Words that have been thrown about in common and careless usage, take on a new significance and potency when Barnard fixes the distinction between them. For example, the vast difference between "effective"

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THE BUYER'S ÆSOP

• *By Irma Fuehr*

THE FABLE OF THE BUYER WHO DID IT ALL HIMSELF

HARKEN to a legend of the Sponduleks, bravest of the red-skinned tribes that lived long ago by the waters of Minnetonka, and of their most famous purchasing agent, Whatscookin. He had earned this name because he was most unhappy unless he saw something bubbling all the time.

Now you might think that purchasing for a primitive, though noble, tribe of red men would be very different from procurement in our complicated society. But the legend says that Whatscookin had his headaches, too. He had problems of shortages and of expediting, even as the buyers of today.

He also had secretarial troubles. His son Manana acted in that capacity, and the father harbored high hopes that his son would one day succeed him as chief buyer for the Sponduleks. But Manana was constitutionally disinclined to fill the position adequately, or even semi-adequately, and Whatscookin was greatly annoyed (or "heap much griped" as the Sponduleks quaintly expressed it) by Manana's utter indifference to anything but eating and sleeping.

One afternoon in the moon of summer showers, it was brought to Whatscookin's attention that there was only one day's supply of willows to meet the squaws' basket production schedule. He whizzed through his birch-bark catalog and located a supplier, the nearby Willowpoughkeepsie tribe, who might be able to deliver the goods. So he turned to Manana, who had just arrived at the office after a night and morning of strenuous sleeping.

"Make out an order for six pony loads of willow twigs," he told his son, "and see that we get immediate delivery. Immediately, as you probably don't know, means now. Today. Not next year or next century."

But irony was always wasted on Manana. "Ugh," he grunted.

"By the spirits of my ancestors!" exclaimed Whatscookin. "*Ugh* isn't enough. I want action. PDQ. We can't let production break down through inefficiency in the purchasing department."

"Ugh, ugh," said Manana after deep consideration.

This drove Whatscookin into a frenzy. "Leave the stolid red man act for Hollywood!" he screamed at his son. "You'll never amount to anything. You've got the ambition of a starfish, the initiative of a mollusk, the drive of an acorn, the farsightedness of a mole, the ingenuity of a stone, the diligence of dead coals, the——." He broke off in despair and frustration. "Get out of here, and never darken the purchasing doorway again."

With a slow, amoeba-like motion, Manana lifted himself from his chair and crept off for his afternoon siesta under the murmuring pines and the hemlocks of the forest primeval.

Whatscookin personally climbed to the top of Mt. Hangover and smoke-signalled the order to the Willowpoughkeepsies. Then he came back and expedited a shipment of salt, interviewed several peace pipe salesmen, and checked with Receiving on a shipment of eagles' tail feathers for war bonnets The sun was already sinking by the time he got around to checking the specification for tepee poles and deciding whether it would be more economical for the Sponduleks to buy their arrow heads already fabricated or to make their own.

The blackness of night came to the purchasing lodge. Whatscookin worked on, while the damp heat oozed in and out of his skin by an osmotic process, and the mosquitos sang by his ear and tested him for blood type (he was type B, as they well knew), and his thyroid worked like a gasoline engine. When he thought to look at the clock, it was midnight, and he sent a messenger to tell his squaw that he wouldn't be home for dinner.

When he finally went home, in the gray of the morning, his mind

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REVIEW OF 1946 COURT DECISIONS AFFECTING PURCHASING

New interpretations of basic law on contract obligations and vendor-purchaser relationships

● ***By Leo T. Parker***
Attorney at Law

RECENTLY an interested reader wrote, in part, as follows: "What I should like to see in print is a review of what you consider the most important higher court decisions decided in 1946 which will assist purchasers to avoid law suits, and also prepare to win suits."

Undoubtedly the same problem is faced by many other purchasing agents. Therefore, we shall review important higher court decisions, involving sale contracts, as decided during 1946.

Seller Delays Deliveries

Many older higher courts have held that if a purchaser continues to demand delivery of purchased merchandise *after* the seller has breached the original contract, such demand and acceptance of some of the delayed merchandise relieves the seller from damages for breach of the contract. However, a late higher court varied this usual law, and held that a purchaser of materials who continues to accept delivery after the seller has breached a contract does not prevent the purchaser from bringing suit and recovering full damages from the owner for breach of the contract.

For illustration, in Vernon Lumber Corporation v. Harcen Const. Company, 155 Fed. (2d) 348, reported July, 1946, it was shown that a construction company and a seller entered into a contract by which the latter agreed to sell and deliver to the company 798,846 feet of lumber at $58.50 per thousand, shipments to start from the date of signing the contract and to be made proportionately at least every two and one-half weeks until completion of deliveries of all lumber eleven weeks from signing of the contract.

The seller over the entire period of eleven weeks delivered a total of only 403,209 feet, and it never forwarded the required proportion of lumber due in any installment period. Therefore, in order to construct the buildings, for which it had contracts, the construction company

was compelled to purchase lumber elsewhere at higher prices. But the construction company continued to demand deliveries from the seller and accepted as much lumber as the seller could and would deliver.

In subsequent suit the higher court held the seller liable in damages to the construction company for an amount equal to the latter's total losses resulting from failure of the seller to fulfill the terms of his contract. This court said:

"Plaintiff (seller) claims 'waiver as a matter of law' because of defendant's (purchaser's) acceptance of lumber after the date set for completion of the contract. . . .We do not agree."

Therefore, this court held that the fact the officials of the construction company demanded and accepted delivery of some lumber after the seller had breached his contract did *not* forfeit the right of the construction company to recover *full* damages from the seller for breach of the contract.

It is certain that a purchaser who takes possession of merchandise cannot rescind the contract, without unusually good reason, as the seller breached his "quality" guarantee.

For instance, in Lang v. Horne, 23 So. (2d) 848, reported January, 1946, it was shown that a buyer and seller entered into a contract. The seller promised to supply abstracts of the title. However, he did not do so. The purchaser without demanding the abstracts continued in possession, use, and enjoyment of the subject of the sale.

Later a dispute arose and the higher court was asked to decide whether the purchaser had a right to cancel or rescind the contract. This court held that the purchaser had no legal right to rescind the contract for the seller's failure to deliver the abstracts within the time required by the contract, whether such failure was willful or not.

In other words, this court clearly held that *before* taking possession of the subject of the sale the purchaser should have demanded the seller to comply with terms of the contract.

Ambiguous Contract

Generally speaking, a seller will not be permitted to earn a profit at the expense of a purchaser based on an ambiguous contract.

For example, in Gregory v. Baer, 149 Fed. (2d) 411, the first paragraph of a contract stipulated that the seller, a lumber manufacturer, would sell to a purchaser "all" of the lumber to be sawn from a designated tract. Another clause in the contract stated that the quantities to be cut were estimated to be not less than 650,000 feet nor more than 1,000,000 feet of lumber.

In subsequent litigation, the higher court held that the manufacturer must cut and deliver to the purchaser *all* the lumber that could be found on the tract, although this quantity was considerably *more* than the quantity "estimated" in the contract. This court said:

"The statement of minimum and maximum quantities set out in the second paragraph of the contract may be considered as an estimate of the quantity of timber on the land,

but it obviously did not relieve the plaintiff (seller) from the obligation to cut and deliver *all* the timber that could be found thereon."

Hence, where a contract specified a definite quantity of merchandise which the seller agrees to deliver to the purchaser, the seller will not be permitted to deliver the quantity "estimated" in another clause of the contract.

Contract Not Definite

Neither a buyer nor seller is liable for breaching an *uncertain* contract. For example, where a contract specifies the quantity of merchandise, but does *not* definitely obligate the purchaser to accept and pay for this quantity, the buyer can without liability refuse to accept delivery of the merchandise.

See Kochtitzky v. John A. Denie's Sons Company, 153 Fed. (2d) 520, reported May, 1946. It was shown in this controversy that a seller and a purchaser had entered into a written contract by the terms of which the purchaser agreed to purchase a minimum quantity of 50,000 tons of gravel and all of the sand produced in the processing of the gravel. This contract also contained a clause which provided that "the balance will be paid as the gravel is sold" by the purchaser. Still another clause in the contract showed that the contract was made *in contemplation* of the purchaser supplying gravel for governmental projects which, however, failed to materialize.

Due to the fact that the government contract had failed to materialize, the purchaser could not accept and pay for the quantity and sand contemplated in the contract, and the seller sued for damages. In the resultant suit the higher court held that the purchaser was not obligated to take and pay for more gravel and sand than he could dispose of in his ordinary business.

In other words, this court refused to hold that the purchaser had breached the contract, because the quantity of material was not definitely agreed upon.

On the other hand, this court indicated that *if* the contemplated government project had materialized, the purchaser would have been obligated to purchase from the seller all of the gravel used on the government project, and all the sand produced in processing the gravel, and if the project had required less than 50,000 tons of gravel, still the purchaser would have been obligated to accept and pay for the specified minimum quantity of 50,000 tons of gravel, and all sand produced in processing the gravel.

Purchaser Not Liable

Generally speaking, where the words used in a contract of sale do not *positively* obligate a purchaser to accept and pay for a *definite* quantity of material, the purchaser cannot be liable although he refuses to accept delivery of any material.

For example, in Hennepin Paper Company v. Fort Wayne Corrugated Paper Company, 153 Fed. (2d) 822, reported May, 1946, it was shown that the Hennepin Paper Company, which operates a paper manufacturing plant, entered into a written contract with the Fort Wayne Corrugated Paper Company. By the terms of this contract the Fort Wayne Company agreed to purchase *monthly* from the Hennepin Company all of the .009 Corrugating

RECENT HIGHER COURT OPINIONS REVEAL NEW INTERPRETATIONS OF OLD LAW

Does acceptance of delayed deliveries after the seller has breached the original contract relieve the seller from liability for damages resulting from the breach of contract?

Can a purchaser become liable for damages by refusing to accept delivery when the contract is indefinite as to the quantity of merchandise involved in the contract?

Is a mere promise, made without legal consideration, held to be a binding obligation?

Is the traditional payment of $1, cited as "consideration" in many contracts, interpreted literally by the courts?

Can a buyer who accepts the benefits of purchased materials avoid responsibility for payment on the grounds that the purchase was not properly authorized?

Under what conditions is a price quotation construed to be a firm offer to sell?

If a note is assignable, but not negotiable, does the assignee have the right to repossess merchandise in the event that payments on the note are in default?

Material to satisfy its "needs", 600 tons, more or less.

The Hennepin Company sued the Fort Wayne Company for breach of the contract when the latter failed to purchase monthly 600 tons of the

material. In this respect the court refused to hold the Fort Wayne liable, saying:

"Neither did it commit defendant (Fort Wayne Company) to buy any certain number of tons per month but 'only that amount of material which it might require'."

Damages For Breach

According to a late higher court decision a seller who breached a contract for sale of merchandise is liable to the purchaser for an amount of damages based on the difference between the contract price and the price which the purchaser was offered for the merchandise on resale.

For illustration, in Norwood Corporation v. McKean, 153 Fed. (2d) 753, reported June, 1946, it was shown that a purchaser purchased a large quantity of lumber. Before delivery the seller sold the lumber to another. The original purchaser sued the seller for damages and asked the court to allow damages equal to the difference between the price of $55 per 1,000 feet, specified in the sale contract, and $125 per 1,000 feet at which he could have sold the lumber had he wanted to do so. The higher court held:

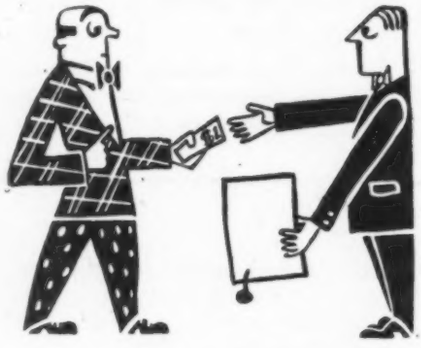
". . . .The measure of damages for failure to deliver lumber contracted for is. . . .the loss 'directly and naturally resulting, in the ordinary course of events, from the seller's breach of contract'. If there is an available market for the goods, the rule as to damages is crystallized into a rule that recovery is the difference between the contract price and the market price."

Also, see Stamps v. Sanders Company, 37 S. E. (2d) 835, reported June, 1946, where the higher court held that a retail seller of merchandise is entitled to recover damages from a wholesaler of the merchandise for breach of a sale contract. This court held that although the retail dealer had no offers to resell this particular merchandise, yet the wholesaler was liable for damages equal to the price for which retailer *could* have sold the merchandise, less the price specified in the contract made with the wholesaler.

Valuable Consideration

According to a late higher court decision a contract is valid and enforceable, although neither contracting party proves that he paid or received "$1 and other valuable consideration" usually recited in a contract.

For illustration, in Coleman v. Whisnant, 37 S. E. (2d) 693, reported June, 1946, it was shown that a sale contract contained the usual clause "for $1.00 and other valuable considerations".



It was contended that the contract was void because no proof could be given that the seller had received $1.00, and other considerations.

The higher court held that in contracts of this nature it is not necessary for either the seller or purchaser to prove that the purchaser gave the seller this specified consideration. This court said:

"At the common law instruments under seal are generally held to be good as against a plea by one of the parties of no consideration, because the seal imports consideration or renders it unnecessary."

Promise Is Void

Contrary to the opinion of a majority of readers a mere promise is void.

See Stonestreet v. Southern, 37 S. E. (2d) 676, reported July, 1946. The testimony in this case showed that an official of a corporation verbally promised to pay a man named Stone the expense and cost of making repairs on purchased equipment. The corporation refused to fulfill this promise.

In the subsequent suit, filed by Stone, the higher court held the promise void, saying:

"A bare promise, made without consideration, creates no legal rights and imposes no legal obligations. Its fulfillment is a matter of grace or favor on the part of the one making the promise."

Delinquent Payments

It is well established law that, under ordinary circumstances, a seller may *repossess* merchandise, or equipment, the *instant* the purchaser fails to *fully* comply with the contract to make monthly payments. However, a recent higher court held that this rule of law is *not* applicable if the seller has *customarily* accepted overdue or delinquent payments from the purchaser.

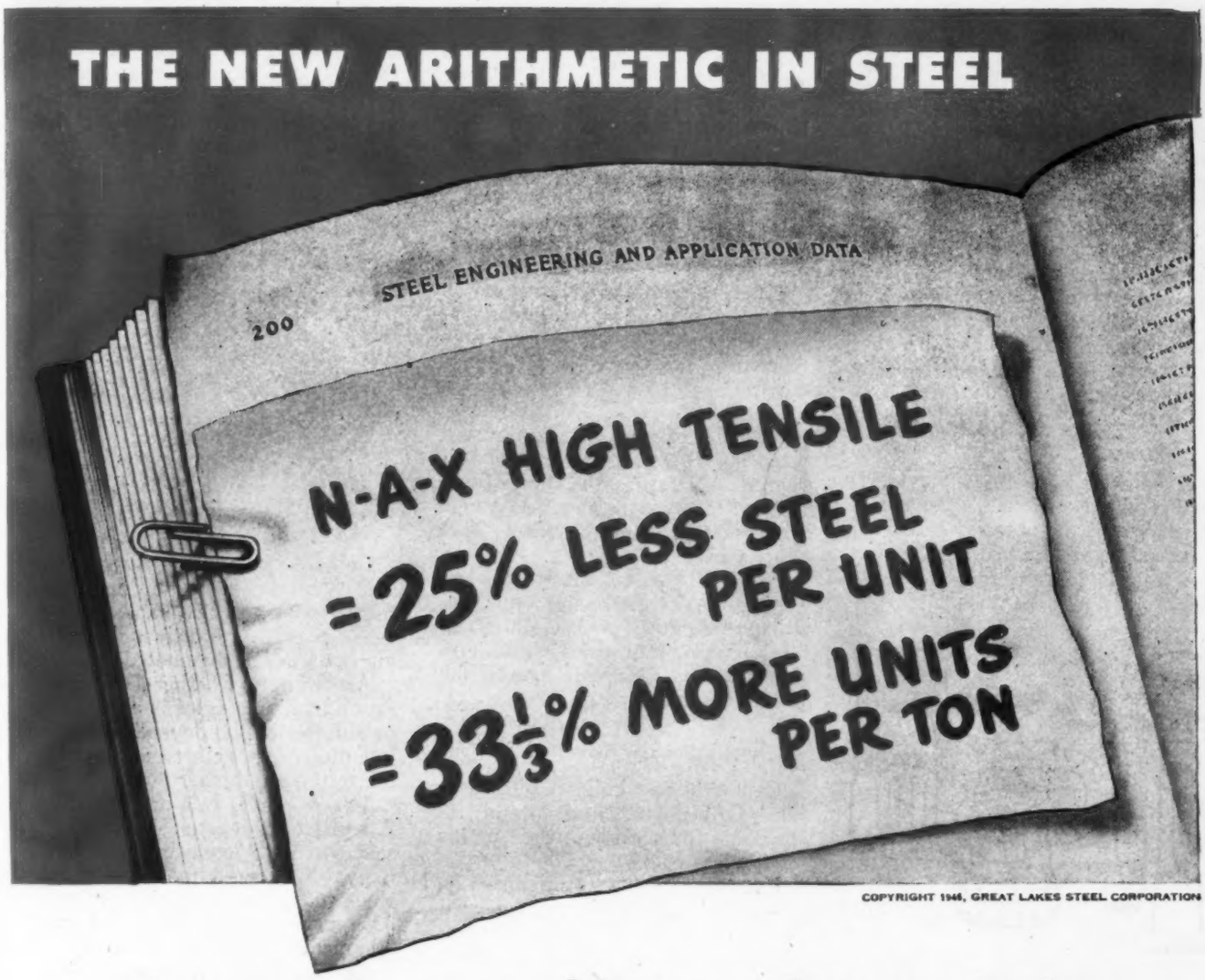
For instance, in Commercial Securities Company v. Mattingly, 26 So. (2d) 37, reported August, 1946, it was shown that a manufacturer sold to a property owner certain gas heating equipment for the sum of $235.50. The latter gave his note and a chattel mortgage as payment. The property owner agreed to make monthly payments on the *first* of each month.

In subsequent litigation, over the amount due, the seller contended that it had a legal right to repossess the equipment because the property owner failed throughout the contract to make the monthly payments on the first of each month. The higher court refused to permit the seller to repossess the equipment, saying:

"Defendant (property owner) had not been in the habit of paying the installments promptly. The evidence shows that for the past twelve

months he was allowed to pay the installments on the 25th of each month. He then had reason to believe that the July installment was not past due on July 10."

When a mortgage or conditional contract is properly signed, blank spaces may be afterwards filled up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STEEL ENGINEERING AND APPLICATION DATA
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=33⅓% MORE UNITS PER TON
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Today, many manufacturers are enjoying the important production advantages brought by N-A-X HIGH-TENSILE steel.

Because of its greater strength, toughness, fatigue- and corrosion-resistance, this low-alloy, high-tensile steel ordinarily permits reduction in sectional thickness of as much as 25%. This means 33⅓% more units per ton of steel—with actual improvement in the strength and durability of finished products. And because N-A-X HIGH-TENSILE steel has exceptional ductility for high-strength steel, it can be deep-drawn and formed into intricate shapes.

In addition to the savings in steel provided by N-A-X HIGH-TENSILE, economies in handling, fabricating and finishing operations can often be effected.

Tomorrow, N-A-X HIGH-TENSILE will be available in ever greater quantities and to a wider field of users. Even though current production can't always keep pace with demand, our engineers will be glad to show you how helpfully N-A-X HIGH-TENSILE steel can fit into your future production picture.

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Specify—
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HIGH-TENSILE STEEL

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only in accordance with directions of the purchaser, which the seller must prove.

In Commercial v. Baker, 37 S. E. (2d) 636, reported June, 1946, it was shown that a purchaser of an automobile defaulted in making the agreed payments and the seller repossessed the automobile. Then the purchaser sued the seller and testified that blank spaces in the conditional contract had not been filled in according to his instructions.

Since the seller could not disprove the purchaser's testimony, the higher court held the seller liable to the purchaser for $2,000 damages.

Note Valid

A note for payment of money is void if based on fraud *unknown* to the maker of the note. However, if a person signs a note knowing that it is based on fraud, he is fully liable.

For example, in Arkansas Company v. Underwood, 193 S. W. (2d) 276, reported June, 1946, it was shown that the owner of motor trucks signed a note in the amount of $475.80 for merchandise delivered to his truck drivers. Later the truck owner refused to pay, but the higher court held the truck owner liable on the note because the testimony showed that at the time he signed it he knew that it represented merchandise purchased by collusive conduct between his drivers and the filling station attendants through courtesy cards. This court said:

"Having signed the note under these circumstances, coupled with his subsequent conduct, he thereafter could not set up a failure of consideration for the note."

Non-Negotiable Note

According to a recent higher court a sale contract is assignable, but not negotiable, if it lacks the fourth requisite of a negotiable instrument which requires that it must be made "payable to order or bearer".

For example, in Gale & Company v. Wallace, 194 S. W. (2d) 881, reported June, 1946, the testimony showed that a man named Wallace purchased certain equipment and paid a stipulated amount down and executed his note in favor of the seller. This note contained *no provision* that it was payable to order or bearer.

Later the purchaser defaulted in making agreed payments and a suit was filed by an assignee of the note to recover possession of the equipment.

During the trial the purchaser proved that the note he had signed was not payable "to order or bearer". Therefore, the higher court refused to allow the assignee to take possession of the equipment. This court said:

"Since this sales contract was not negotiable but assignable only, appellant (assignee) took it subject to all defects or infirmities available to the maker as a defense against the payee therein."

Purchaser Benefited

Generally speaking, a purchaser who is benefited must stand responsible for contracts made by his employee.

For example, in Humphries v. Shipp, 194 S. W. (2d) 693, reported July, 1946, it was shown that an employee purchased certain materials which went into the construction of a building.

The owner of the building refused to pay the bill on the grounds that he never authorized the employee to purchase any materials. However, the higher court held the building owner responsible because the materials were used in the building and he was "benefited".

Offer And Acceptance

It is well established law that when either a buyer or seller makes an "offer" which the other unconditionally accepts, a valid and binding contract is made. However, according to a recent higher court, a statement of prices of merchandise is not an offer when the one quoting the prices intends to retain the right to sell the merchandise to any bidder and customer.

But it is certain that if the minds of the parties have met on the terms and conditions, a valid contract is made. For illustration, in Nickel v. Theresa Farmers Coop. Ass'n, 20 N. W. (2d) 117, it was shown that a prospective purchaser asked and received from a seller prices on certain building materials. The seller directed the purchaser to get an architect to estimate the materials needed, have it sent to him, and that he would then send materials over to the building site.

Later the seller argued that there was no valid contract, but the higher court held the dealer liable in damages for failure to deliver the building materials at the quoted prices.

Accordingly, whether a communication naming a price is a quotation or an offer to sell depends upon the intention of the seller manifested by the testimony during the trial.

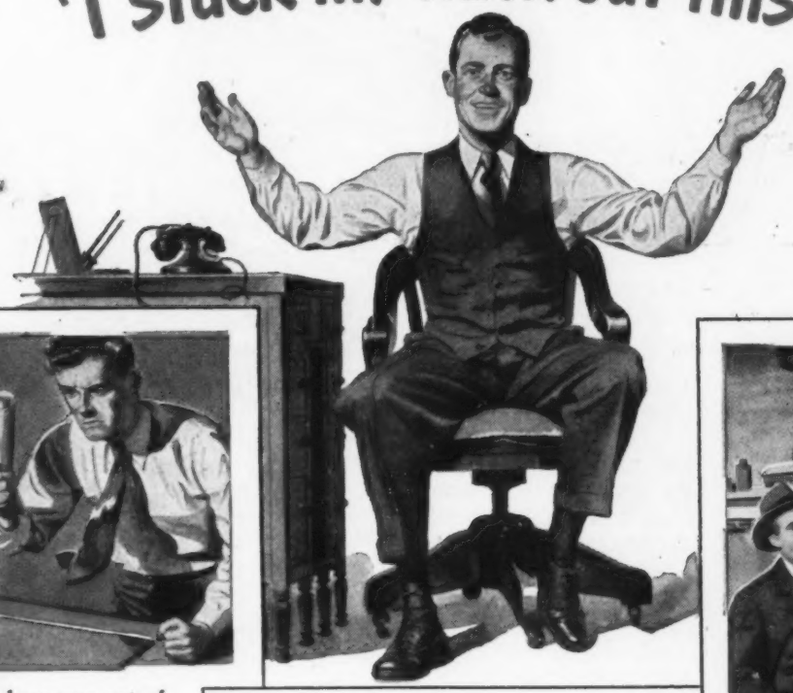
For example, in Boyer v. Duke, 2 I. R. 617, it was shown that a seller wrote a letter in reply to an inquiry for lowest quotation on canvas, stating the ". . . lowest price, 32½ inches wide is 4⅝ d. per yard, 36 inches measure. Delivery of 3,000 yards in 5-6 weeks". This court held that this letter was not an "offer" to sell, but merely a quotation of prices which the purchaser could use as a basis for writing another letter "offering" to purchase a specified quantity of canvas at the quoted prices, and which offer the seller was privileged to accept or reject.

And, again in Lincoln v. Erie, 132 Mass. 129, it was shown that a telegram was sent by a seller (in reply to a telegram from a purchaser asking how much corn he could sell with lowest cash price) stating "three thousand cases, one dollar five cents, open one week".

The higher court held this telegram was a mere quotation which the purchaser could not "accept" and make a valid contract.

On the other hand, many higher courts have held that there is sound reason for holding that prices quoted in response to an inquiry stating that prices were "for immediate acceptance" *are* "offers" which may become a binding contract by acceptance.

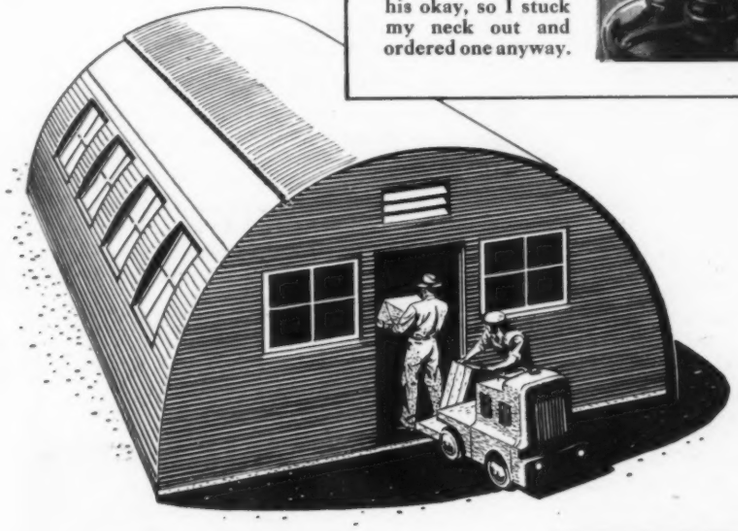
"I STUCK MY NECK OUT THIS FAR— AND AM I GLAD!"



1 "The boss was out of town when the factory manager stormed into my office and said he had to have additional warehouse space right now to store the castings coming in for those new orders.

2 "I knew a 'Quonset 20' was the answer, because they go up quickly and easily, cost so little and are safe and sturdy. I couldn't locate the boss by phone for his okay, so I stuck my neck out and ordered one anyway.

3 "When the boss got back, the 'Quonset 20' was already in use. The factory manager was turning out his work on time, and the boss said he was glad I had enough initiative to act on my own good judgment in an emergency."

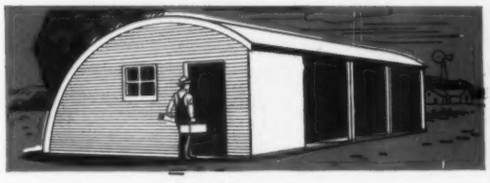


"AND I GOT A NICE BONUS FROM A SWELL BOSS!"

"The boss was so pleased with that 'Quonset 20' that he had me order more of 'em—and gave me a nice year-end bonus to boot. It will probably pay you, too, to know all the facts about 'Quonsets.' See your local 'Quonset' dealer, or write direct for his name and additional information."

THE "QUONSET 20"

No doubt the world's most versatile building. *Nailable* Stran-Steel construction enables you easily to adapt the clear-span interior to any purpose. Extra doors, windows or partitions readily installed. Durable, fire-resistant; won't sag, warp or rot. Width is 20 feet, length variable in 12-foot extensions.



THE "QUONSET 24"

Another popular member of the "Quonset" family. Width 24 feet, with variable length, like the "Quonset 20."

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New PRODUCTS · IDEAS

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LIFE RATING OF MERCURY LAMPS IS INCREASED

INCREASED life rating of 1000 hours for the 3000-watt A-H9 mercury lamp is announced by the Lamp Department, General Electric Co., Nela Park, Cleveland, Ohio. The life rating of this lamp, used for industrial lighting where an efficient high level of illumination is required for large areas in foundries, over assembly of large equipment such as transformers and generators, in locomotive works, and aircraft plants, etc., has been increased from 2000 to 3000 hours. Electrical characteristics, initial ratings, and lumen maintenance remain unchanged.

TURRET DIAMOND HOLDER

AN automatic, self-centering turret diamond holder, said to double the life of diamonds, improve accuracy of grind and avoid destruction of diamonds by "out of round" wheels, is announced by Diamond Tool Co., 938 E. 41st St., Chicago 15, Ill. Tool, which is licensed for use only with "Re-Set-Able" diamond tools, has 3 positions providing a 30°, 20° and 10° drag angle. Mechanical action of turret holder centers diamond point at point of grind.

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YOU CAN GET PAINT!

FOR FLOORS

CAR-NA-CRETE

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RUBBER ENAMEL

AVAILABLE FOR IMMEDIATE DELIVERY

WEARS LONGER

Tests made with a special scrubbing device, using water and alkaline cleaner, showed the following results:

Oleoresinous type (ordinary floor enamel) about 50 percent removed after 100 strokes.

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CAR-NA-CRETE about 5 percent removed after 43,000 strokes.

RESISTS MOISTURE

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Car-Na-Crete on a concrete slab showed no sign of deterioration after immersion for one month.

SUPER ENAMEL for CONCRETE FLOORS

NON-SEPARATING *NON-SKINNING*
NON-SETTLING *FREE-FLOWING*

MADE from rubber resins, color pigment, drying oil and solvents, Car-Na-Crete is applied like any other enamel or paint. Dries to touch in one hour. Can be walked on in eight hours. Permanently set in twenty-four hours with 90% the hardness of plate glass.

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FOUR POPULAR COLORS: GRAY, BROWN, GREEN, TILE RED

Write for Color Card and Prices

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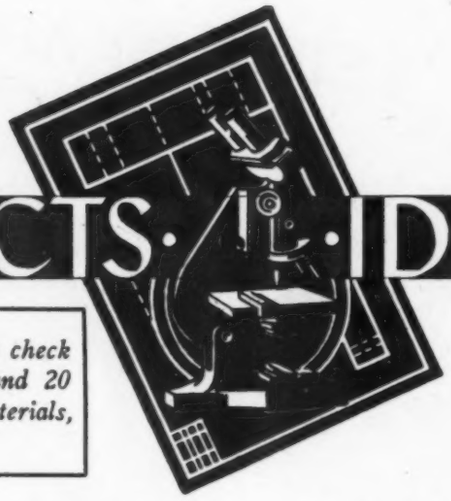

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CONTINENTAL CAR-NA-VAR CORPORATION

1653 EAST NATIONAL AVE. BRAZIL, INDIANA

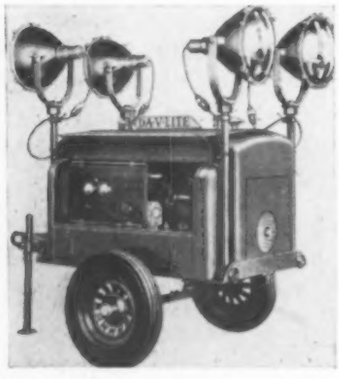
WINCH OPERATED SWING STAGE

NEW "Saf - T-Swing" light duty swing stage, designed for maintainance work, painting, cleaning, etc., is announced by Safway Steel Products, Inc., 6312 West State St., Milwaukee 13, Wisc. Swing consists of two winches, each equipped with 150 ft of cable, and each bolted to a removable stirrup which will take a platform up to 28" wide. A guard rail post is welded to each stirrup. The gear type winch uses a 5/16", 6 x 19, mild plow steel wire rope. Safety lock on winch automatically engages when operator releases crank handle. Raising or lowering speed about 75 feet per minute. Saf-T-Swing bears the Underwriters' Seal of Approval.

PLATING & PICKELING RACK COATING

NEW solution, known as Korolac RX-2500, for coating of electro-plating and pickeling racks, is announced by B. F. Goodrich Co., Akron, Ohio. Coating is white, opaque and glossy. Hot alcoholic reverse current cleaners, and such oxidizing acids as chromic and 40% nitric are said to have little or no effect upon it. Its resistance to organic solvent cleaners is also said to be remarkably good. Korolac Primer No. A-208-B, is used in conjunction with the solution to provide adhesion of the coating to the metal rack.

PORTABLE POWER UNITS



FOUR new DA-V-LITE portable lighting and power units are announced by Davey Compressor Co., Kent, Ohio. Each is built around a 5000-watt Westinghouse self-excited, self-regulated a-c generator. Models are: (1) *Floodlight*, equipped with four heavy-duty Westinghouse 16" floodlights, providing 185,000 cp per light; (2) *Searchlight*, equipped with two Westinghouse 18" searchlights furnishing 1,965,000 cp per light; (3) *Combination*, with two 16" floodlights and two 18" floodlights; and (4) *Beacon*, with one 24" Westinghouse 11,280,000 cp searchlight.

AUTOMATICALLY CONTROLLED PRECISION FURNACE

NEW automatically controlled furnace, for precision use in laboratories, small unit and batch production work, is announced by the K. H. Huppert Co., 6830 Cottage Grove Ave., Chicago, 37, Ill. Called the Huppert No. 5 De Lux, the furnace features a combination three-way heat range switch and an automatic temperature timer, allowing the maintaining of constant temperatures ranging from 200° to 1800° F., with a minimum variation of not more than 10°, and also allowing the bringing of the furnace to a heat rapidly or slowly. Dimensions of the work chamber are 4¾" by 3¾" by 9". Overall measurements are 19" by 21" by 21", and the throat measures 2". Maximum operating temperature is 2,000° F.

ROTARY SPINDLE AND QUENCH RING

COMPACT, hydraulic rotary spindle and quench ring, combined in single unit, designed for use with any type of induction heating equipment, is announced by Induction Heating Corp., 389 Lafayette St., New York, 3, N.Y. Unit simplifies handling and heat treating of parts requiring rotation during heating cycle and subsequent quenching in position. Unit is portable and is easily moved from one coil to another. Rubber suction cups hold it firmly in position. Interchangeable quench rings and adaptors are available in four sizes, 4¾", 7", 9", and 12" I. D.

DOUBLE VERTICAL SPINDLE GRINDER

NEW 12" Double Vertical Spindle Grinder, listed as the No. 902, for high output on small parts, is announced by Charles H. Besley & Co., 118-124 N. Clinton St., Chicago, Ill. It is designed to speed the grinding of steel rollers, carbon brushes, washers, ceramic parts and a wide variety of small pieces with allowable tolerances. The grinder features a horizontal rotary feed which enables the operator to drop the small parts into the feed wheel rapidly and accurately, producing substantial savings in time and measurably reducing operator fatigue. It will for example, grind from 3000 to 4000 small coil springs per hour.

AIR POWERED ARBOR PRESSES

TWO fast air powered all-steel welded construction arbor presses suited for light push or pull broaching jobs, assembling, stamping, forming, riveting, punching, cutting or similar punch press operations, are announced by Studebaker Machine Co., 1221 S. 9th Ave., Maywood, Ill. They give up to 200 ram blows per minute; can be regulated to slow squeezing action. The Hurricane Six develops 1 to 1½ ton ram pressure, and the Hurricane Eight develops 2 to 3 tons ram pressure, on both up and down strokes; hand lever, foot pedal or solenoid control. Dimensions: approximately 35" high overall, 22" deep. 10" wide. Clear space from platen to ram when fully retracted is 11½"; throat depth 8" to 9¼". Bulletin available.

AQUEOUS FILM-FORMING MATERIAL

NEW aqueous film-forming material of interest to paint, paper, and textile industries, called Dow Latex 512, is announced by Dow Chemical Co., Midland, Mich. It is a combination of styrene and butadiene which when air-dried is said to form a rubbery tough film with excellent pigment binding properties and a high protective value. Its compatability with many aqueous emulsions or dispersions of resins, oils, varnishes, starches, waxes, casein, plasticizers and water soluble gums is another of its important characteristics. Available in 55 gallon non-returnable steel drums and tank cars.

INCLINED BELT CONVEYOR

NEW Standardized "Inclinebelt Conveyor", for elevating or lowering commodities, is announced by Standard Conveyor Co., North St. Paul, 9, Minn. Conveyor, set permanently at 28 degree incline, is equipped with a rough surface belt available in 14" or 24" widths. Both widths belt are made for floor to floor elevations of 8'-0" to 14'-6" inclusive. Conveyor can be furnished with or without bottom horizontal feed section. Top end is curved to provide horizontal feed or discharge. Size & type motor for conveyor depends on local requirements and current available.

(Please turn to page 154)

Youngstown's High-Tensile Low-Alloy Steel demonstrates superiority on Atmospheric corrosion-test racks

THE "gridiron" shown above is a battery of test racks located on the Eastern seacoast of the United States. Hundreds of samples of various steels and metals are exposed on these racks to severe marine atmosphere and are examined periodically to compare the results of various samples. Similar racks are placed in industrial and rural locations.

On these racks and in actual service tests, Youngstown's high-tensile low-alloy steel, familiar to steel users everywhere as "Yoloy," has proven itself to resist corrosion several times better than mild carbon steels.

This unusual ability of Yoloy steels to resist corrosion is due to the influence of its nickel and copper content. These same two constituents give Yoloy other valuable properties--extra tensile strength, added impact strength at low temperatures, good ductility, easy weldability, and increased resistance to abrasion.

Whenever you have an extra tough job for steel, or where you want to reduce dead weight without impairing strength consider Yoloy--the steel that's tested and proved in the laboratory of time. Let us discuss your requirements for future construction.

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

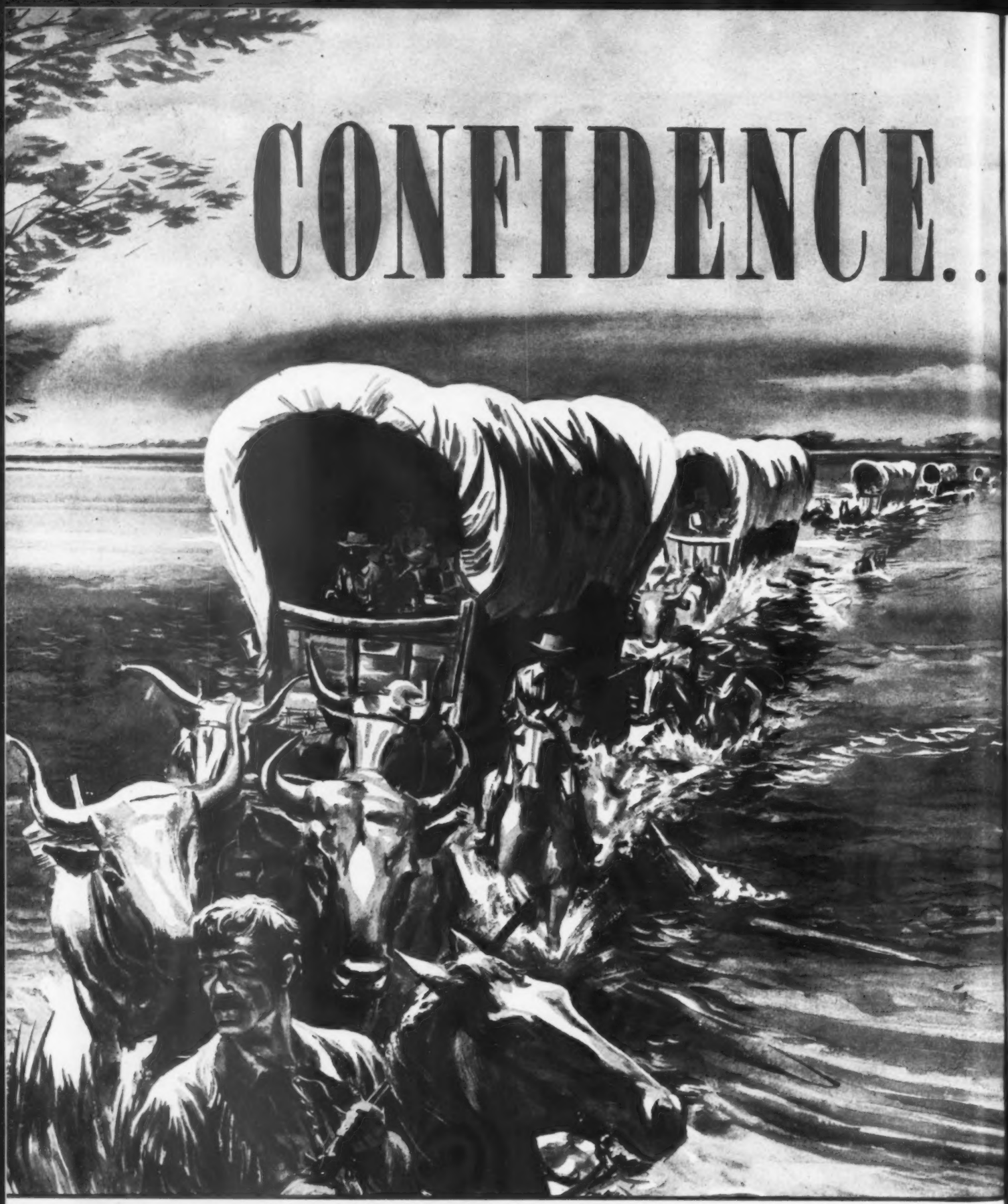
GENERAL OFFICES - YOUNGSTOWN 1, OHIO

Export Offices - 500 Fifth Avenue, New York City

Manufacturers of

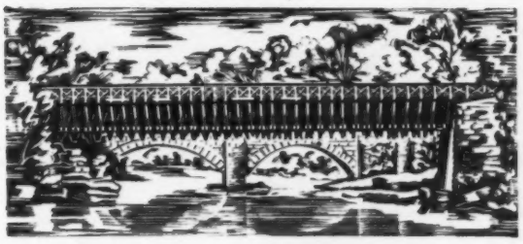
CARBON - ALLOY AND YOLOY STEELS

Sheets - Plates - Pipe and Tubular Products - Bars - Rods - Wire - Cold Drawn Carbon Steel Rounds - Tie Plates and Spikes - Conduit - Electrolytic Tin Plate - Coke Tin Plate.



Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems
Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts

.....how much is it worth?



IN 1844, three years before Alexander Graham Bell was born, and long before the first Prairie-Schooner crossed the Mississippi River, John August Roebling's confidence in the suspension principle of construction so impressed the engineers of the State of Pennsylvania, that they authorized him to build the world's first suspension aqueduct.

How much is his confidence worth to all the thousands of engineers who followed and to humanity in general that have benefited from his pioneering venture?

And how much is the confidence of the John A. Roebling's Sons Company in the future of American industry worth to you, that keeps Roebling development and Roebling products in the lead?

Roebling's greatest asset is your confidence in Roebling and its confidence in your future. That is why Roebling's every effort is dedicated to the preservation of this confidence—your's and Roebling's.

...IN ROEBLING SPRING WIRE...

for example...

PATENTING AND DRAWING high carbon steel wire is truly an art. But so, too, are the open hearth steel making, the blooming and billet mill, and the rod rolling operations.

At Roebling the importance of each of these steps is fully realized. That is why you will find that all are done in Roebling mills, by Roebling workmen. This means that the greatest possible manufacturing care can be combined with the most exacting methods and workmanship to give you wire that is absolutely uniform in grade, in temper, in finish.

Roebling spring wire will meet your toughest specifications. And remember, too, the more demanding your wire requirements the more confidence you can have that they will be met exactly—by Roebling.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

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LOOK to the Rising Star

FOR CAP SCREWS AND OTHER THREADED FASTENERS

TRIPLEX Threaded Fasteners

Extra strength means added safety in any assembly

CAP SCREWS

In all popular sizes up to 1" diameter and 8" lengths.

BOLTS

Machine, stove, carriage, lag, plow, step and sink.

NUTS

Semi-finished, hot-pressed, square, hex, jam and castellated hex.

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THE TRIPLEX SCREW COMPANY

5331 Grant Avenue • Cleveland 5, Ohio

TRIPLEX THREADED FASTENERS

CAP AND SET SCREWS • BOLTS, NUTS AND RIVETS

WET GRINDERS

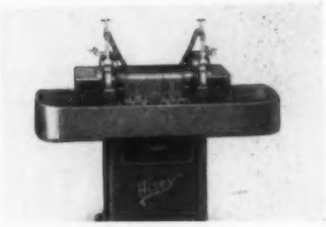
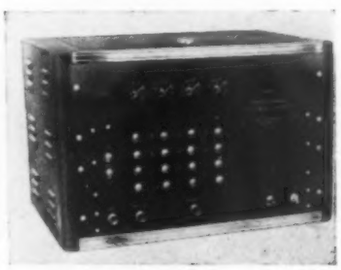


ILLUSTRATION shows double-end model Wet Grinder manufactured by Hisey-Wolf Machine Co., Cincinnati, 25, Ohio. Company announces improved line of wet and combination wet-and-dry grinders, with improved bearing seals, motor mounting, settling chamber, etc. Grinders are made in sizes for 10, 12, 14, 18, 20, 24, and 30 inch grinding wheels. Motor is mounted on rear of pedestal with V-belt drive to spindle. Pump is of self-priming type with individual control valve for each wheel.

REMOVES OIL AND GREASE DEPOSITS

NEW emulsifying agent, called Mulsirex, for use with kerosene and other petroleum cleaning agents to insure greater safety, efficiency and economy, is announced by Turco Products Inc., Los Angeles, Calif. Manufacturer recommends it for removing very heavy deposits of oil and light grease from all kinds of metal parts and equipment. Its high flash point (180° F.) increases margin of safety for operator. It can be used in dilutions as high as 1 to 10 with solvents; may be applied with a spray, brush or mop, or as a cold tank immersion solution; and is harmless to metals and enameled surfaces.

ELECTRONIC COUNTER



SINGLE Channel Predetermined Counter Model 140, designed for high speed counting, batching and packaging of processed items such as sheet metals, pills, buttons, hardware, etc., is announced by Potter Instrument Co., 136-56 Roosevelt Ave., Flushing, N. Y. The desired count (0 to 10,000) is initially set up by means of dial switches located on the front panel of the instrument. Automatic control stops or diverts flow of materials upon completion of required count. The counter can be set to recycle automatically, or manually by means of a remote control switch. Unit will count and control at rates of 15,000 per minute and higher.

(*Please turn to page* 156)

General Electric Announces A NEW GUIDE to Industrial Refrigeration and Air Conditioning

17 case histories tell how important industries SAVE MONEY...CUT OVERHEAD... INCREASE PRODUCTION

DOZENS OF INFORMATIVE INSTALLATION PHOTOGRAPHS © DESCRIPTIONS OF MOST FREQUENTLY USED HEAT TRANSFER SYSTEMS

READ ABOUT THESE INTERESTING APPLICATIONS

- Precision Assembly Operations
- Roller Hearth Furnace Roll Bearings
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Present Day Practice in Belt Fastening

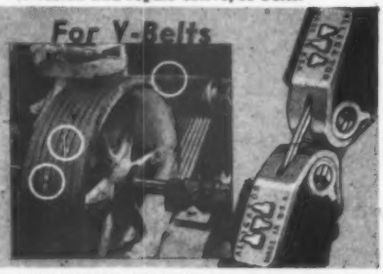
Every man who has anything to do with the purchase, application or maintenance of conveyor, transmission or V-belts will find the bulletins listed below of considerable value in connection with belt fastening work. A knowledge of present day practice in belt fastening helps reduce the loss in machine hours due to belt failures caused by the use of the wrong type of fastener or improper application. We shall be glad to send any or all of them to you or to any of the men in your organization.

For Conveyor Belts

FLEXCO HD Belt Fasteners are used to make a "water-tight" butt joint in conveyor belts ranging from ¼" to 1½" thick and of any width. The view on the right shows the various types of rips and patches that can be made with these fasteners and Flexco HD Rip Plates.

Bulletin F-100 gives complete details on how to fasten and repair conveyor belts.

For V-Belts



ALLIGATOR V-Belt Fasteners are now being widely used to fasten B, C and D, open-end V-belting of cross woven fabric core construction now being made by most belting manufacturers. The view at the left shows a typical application of these fasteners to a drive where endless V-belts would require dismantling the machinery to put the belts on the sheaves.

Bulletin V-205 gives complete instructions on how to use V-belt fasteners.

FLEX V Fasteners for A and B belts are also available for lighter duty V-belt drives. Ask for **Bulletin V-14.**

For Transmission Belts

ALLIGATOR Steel Belt Lacing is in world-wide use to make smooth, flexible joints in leather, rubber, balata, stitched canvas or solid woven belts up to ⅜" thick and as wide as they come.

Bulletin A-60 tells how to fasten and repair transmission belts.

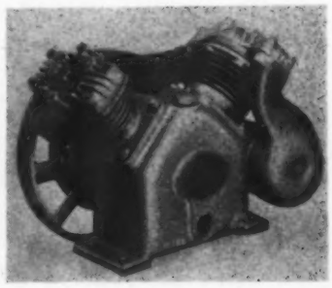
Sold by Supply Houses Everywhere

FLEXIBLE STEEL LACING COMPANY
4697 Lexington Street, Chicago 44, Ill.

HEAVY DUTY BENCH GRINDER

NEW 6" Heavy Duty Bench Grinder, designed and styled for better service in grinding, tool sharpening, wire brushing and buffing, is announced by Black & Decker Co., 500 East Pennsylvania Ave., Towson, Md. Steel wheelguards give extra protection. Adjustable U-shaped tool rests are fitted around grinding wheel for improved support in tool sharpening. Grinder can be bolted to a bench or mounted on a pedestal. Standard equipment includes two grinding wheels; medium grade for rough fast work; fine grade for finish grinding and tool sharpening.

AIR COMPRESSORS



SINGLE-stage and two-stage air compressors for pressures up to 250 psi for mating to standard motors of 1 to 5 h.p. have been announced by Worthington Pump and Machinery Corp., Harrison, N. J. Compressors designated, "Air King", the line includes self-contained power driven models mounted on bases or tanks as well as bare compressors for either direct or V-belt connection to drivers. New principle in automatic starting of compressors is used. A centrifugal clutch permits the driving motor to attain full speed before the compressor turns. This eliminates need for starting unloaders, check valves, release and bleeder valves. Direct power drive eliminates transmission losses and drive adjustments. Descriptive literature is available in Bulletins H620B26 and H620-M13.

FLAT-BELT DRIVE PUMPS

IMPROVEMENTS in flat-belt drive rotary pumps, supplied with removable liners for abrasive liquids or with steam-jacketed heads for viscous liquids, are announced by Blackmer Pump Co., Grand Rapids, Mich. Pump capacities range from 10 to 750 gpm with pressures to 100 psi. New one-piece combination bracket and belt shifter provides faster and easier belt control, prolongs bearing life and maintains better shaft alignment. New structural steel base with transverse trusses is said to be lighter and stronger than the previous cast iron base. Decreased headroom requirements are also claimed for the new design.

(*Please turn to page* 158)

Large Diameter GEARS

SPUR • BEVEL • MITRE • WORM
WORM GEARS • RACKS
Spur Gears to 145" dia.
Bevel and Mitre Gears to 60" dia.
Worm Gears to 72" dia.
Any material!
Over 50 years' experience

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KEEP PRODUCTION ROLLING ON BEARINGS FROM L & S

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INDUSTRIAL GAUGES
For Immediate Shipment

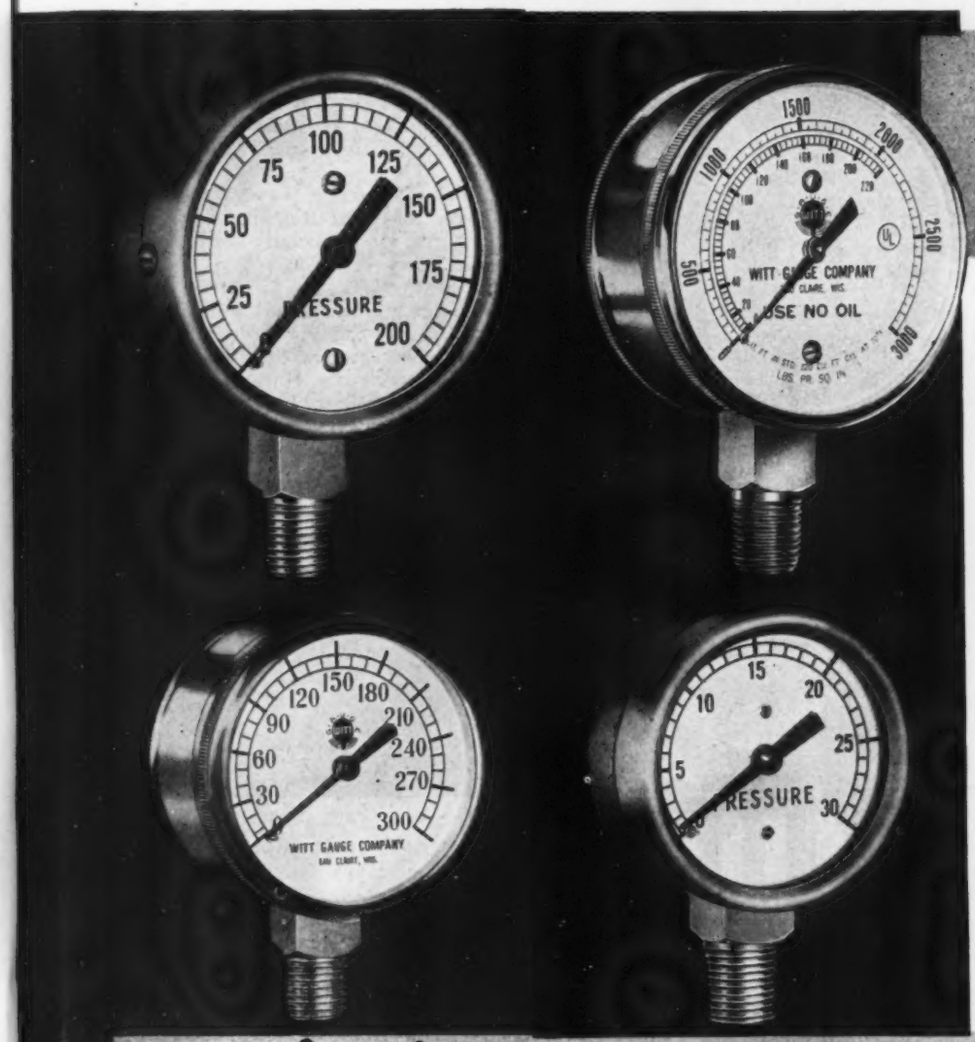
Combining highly specialized equipment with expertly trained personnel, the Witt Gauge Company is supplying precision gauges to manufacturers demanding highest quality and performance.

Before and during World War II, the Witt Gauge Company produced thousands of high-pressure gauges for regulating hydraulic pressure, oil pressure, fuel pressure and a multitude of other uses.

Precision work is combined with mass production methods to solve any gauge problem you may have.

When inquiring about quotations and manufacturing schedules, please include sample or blueprint and pertinent data.

Catalog on request. Certain types of gauges available for immediate shipment from warehouse stock.



WITT is one of NINE manufacturers having approval of Underwriter's Laboratory for high pressure gauges!—

Available with these specifications:

- Gauges for pressures up to 3,000 lbs.
- Dial-size standardized at 2″ and 2½″ in all pressures up to 3,000 lbs.
- Cases made of brass, steel or aluminum . . . enameled, plated or buffed per specifications.
- Glass face available in beveled plate glass, laminated safety glass or plain window glass.
- Dial faces available in luminous or plain figures . . . can carry customer's name or other markings per specifications.
- Gauges available in upright, angular or backmount sockets.

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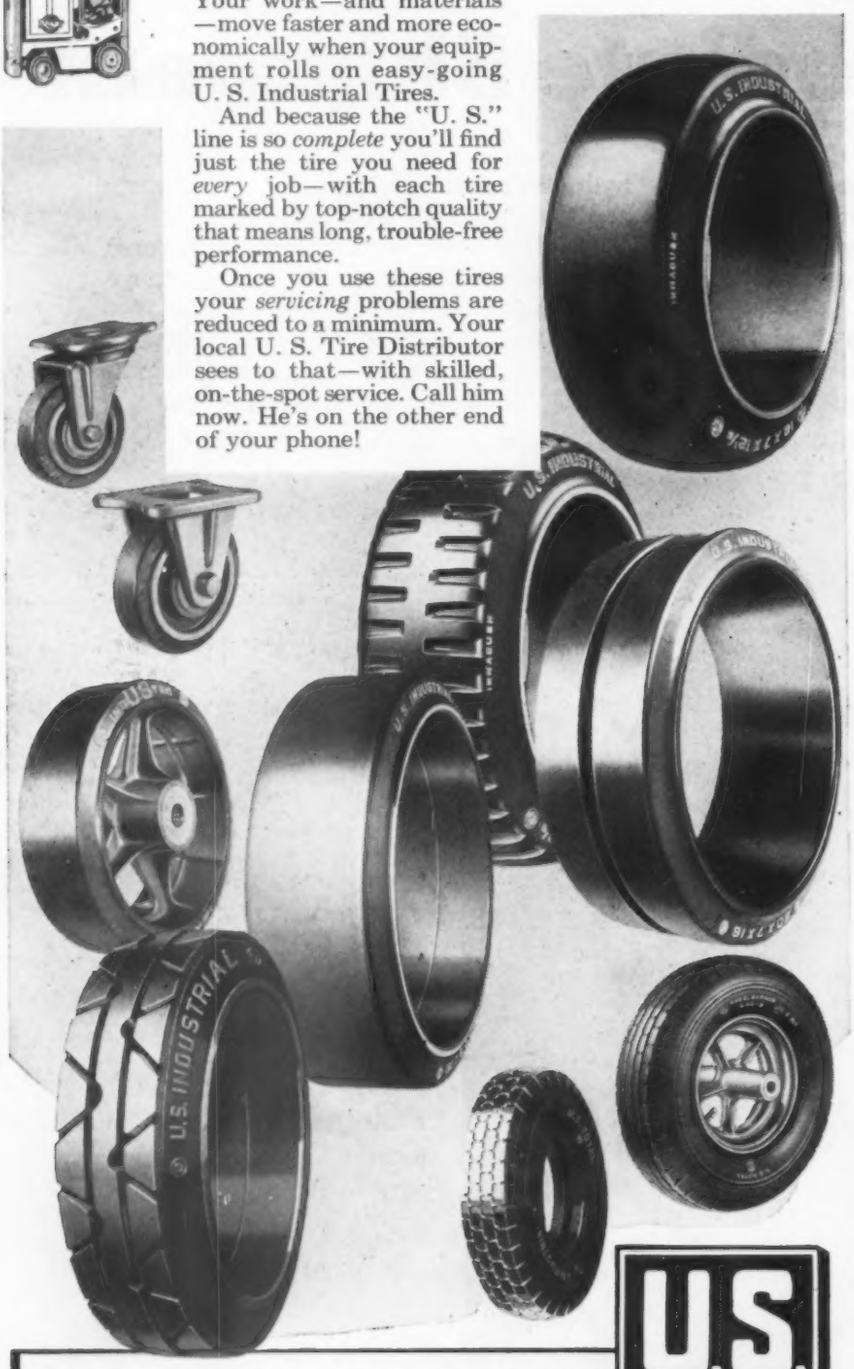
AT LESS COST ON U. S. INDUSTRIAL TIRES!

Your work—and materials—move faster and more economically when your equipment rolls on easy-going U. S. Industrial Tires.

And because the "U. S." line is so *complete* you'll find just the tire you need for *every* job—with each tire marked by top-notch quality that means long, trouble-free performance.

Once you use these tires your *servicing* problems are reduced to a minimum. Your local U. S. Tire Distributor sees to that—with skilled, on-the-spot service. Call him now. He's on the other end of your phone!



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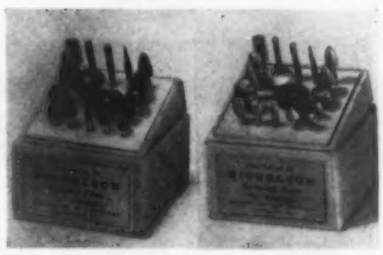
Has *the right tire . . . the right service*
. . . for every job!

U.S. *load-rated* INDUSTRIAL TIRES

UNITED STATES RUBBER COMPANY
1230 Avenue of the Americas • Rockefeller Center • New York 20, N. Y.

ROTARY FILES AND BURS



NEW line of hand cut rotary files and ground burs with ⅛" shanks, for use in relatively delicate operations, is announced by the Nicholson File Co., 28 Acorn St., Providence 1, R. I. Nine standard styles or shapes available. Stock diameters of heads range from ⅛" to ⅝". Shanks are code stamped for easy identification. Files and burs may be used with portable tools (air or electric), drill presses or flexible shafts at speeds up to twice those recommended ¼" shank tools. Assortments of 18 hand cut rotary files or 18 ground burs are offered in box which serves as bench stand.

HEAVY DUTY TRUCK TIRES

NEW line of truck tires, called the Road Lug, designed and developed for combination off-the-road and highway service, is announced by Goodyear Tire and Rubber Co., Akron, Ohio. Tire is particularly suitable for hauling heavy loads on rocky, rutty or stump obstructed roads to surface highways. Tires are constructed with a rayon cord carcass tread and sidewalls with natural rubber content equal to pre-war tires of the same size, extra heavy layers of cushioned rubber between plies of extra heavy rayon breaker. All sizes have multiple beads of high carbon steel wire.

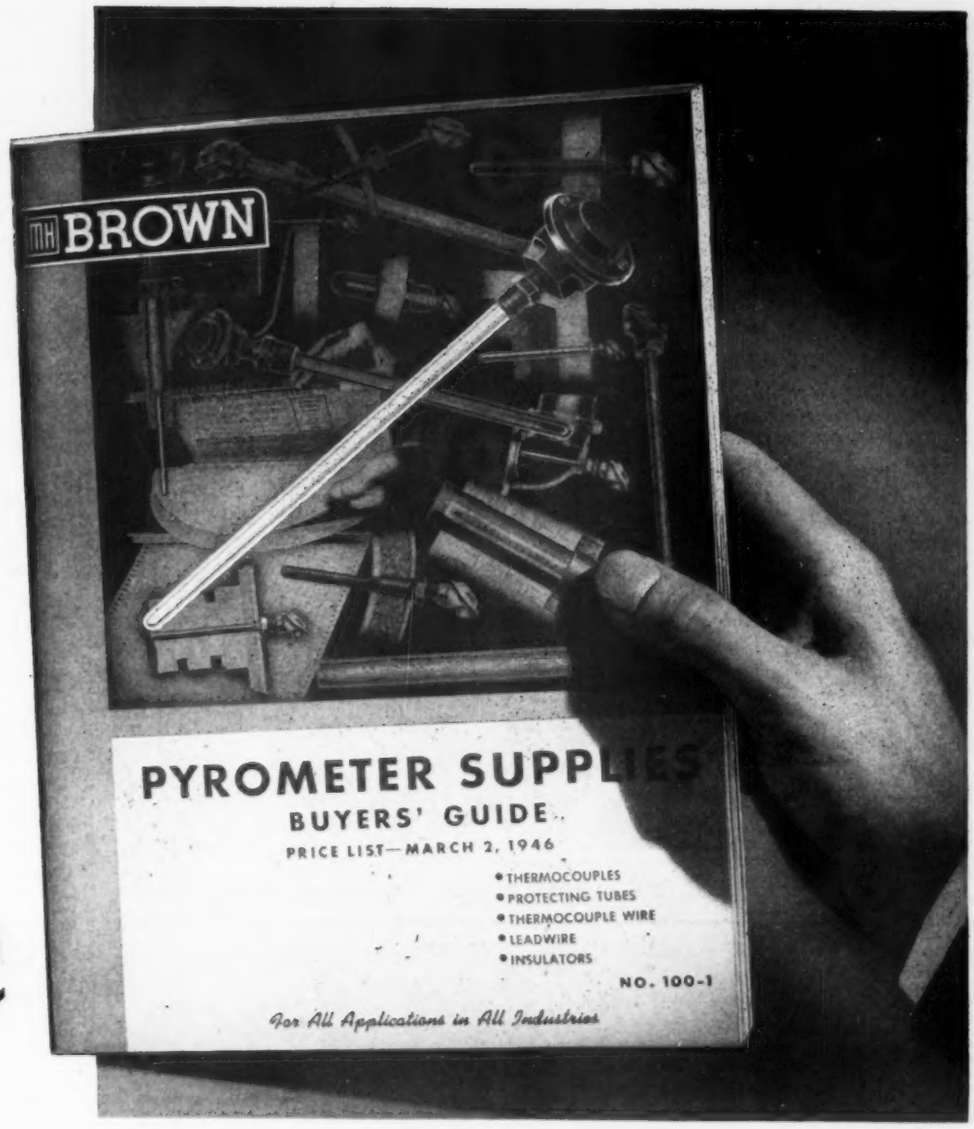
VARIABLE SPEED POWER DRIVE

VARIABLE speed power drive, designed to meet any fractional hp drive requirement, is announced by Flinchbaugh Co., 750 South Court St., York, Pa. Called the "Men-E-Uses" Power Drive, it has a range of from 20 to 750 rpm with 1725 rpm motors and can get down to 4 rpm with additional auxiliary shaft. It has universal mounting for motors of ½ hp and under. Either direction of shaft rotation can be secured by mounting motor right or left on base. Bulletin No. P available.

(*Please turn to paye* 162)

THE BOOK YOU'LL NEED IN A HURRY

Free



You may need this Buyers' Guide in your plant right this moment . . . or maybe tomorrow morning. In any event, if you have even one pyrometer instrument, you *will* have need for this easy-to-use, informative Buyers' Guide.

This Buyers' Guide reduces the often complex job of ordering pyrometer supplies to A, B, C's. When a thermocouple, lead wire or other pyrometer supply needs re-ordering, it is easy to locate, order and find the price in this book.

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Without obligation, please send me copy of "Pyrometer Supplies Buyers' Guide No. 100-1."

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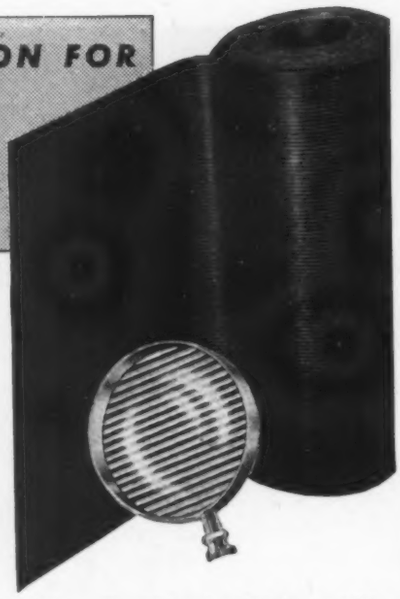
HEAVY TRAFFIC FLOORS!



COSTS LESS THAN 6c PER SQUARE FT.

Here's hard-to-beat economy! Rubberlike, the modern composition floor runner with rugged corrugations protects all heavy traffic areas for less than 6c per square foot! Widely used in factories, offices, schools, hotels, cafes, institutions, it quiets footsteps — makes slippery floors safe. Skidproof even when wet. Easy to clean, Rubberlike runner needs no special upkeep, can be put down without cementing. Won't curl at edges. Amazingly durable — and doubly desirable because of its "petty-cash" cost! In rolls, 27 in. by 100 ft. or 36 in. by 75 ft. Order from supply house or write for sample. Bird & Son, inc., 149 Washington Street, East Walpole, Mass.

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PATENTED NON-RUBBER CONSTRUCTION
BIRD NEPONSET PRODUCTS
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GRIFFIN HIGH SPEED STEEL

Your Best Buy for Cutting Toughest Alloys

Griffin High Speed Steel Blades are made of specially Griffin-tempered 18-4-1 high speed tungsten steel. Their specially milled raker-set teeth insure clean, accurate cutting of toughest, hardest alloys steel — stainless, chrome, nickel, etc. — and maximum number of cuts per blade. Power machine and hand frame sizes.

OTHER GRIFFIN BEST BUY BLADES

Griffin Special Alloy molybdenum high speed steel blades for economical general production metal sawing . . . Improved New Griffin hand saw blades, flexible as a soft-back, tough as an all-hard . . . Griffin Non-Strip — teeth do not break out when sawing thinnest sheet or tubing — hand frame sizes . . . Write for new 20 page Price List.

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GRIFFIN
Hack Saw Blades
MADE BY G. W. GRIFFIN CO. FRANKLIN, N. H.
Hack and Coping Saw Blade Specialists Since 1880

SHELL END MILLS

NEW line of Red Streak carbide tipped and Blue Streak Tantung tipped shell end mills, manufactured in right and left hand styles, ranging in sizes from 2½" OD to 4½" OD and bores 1" to 1½", is announced by Vascoloy-Ramet Corp., North Chicago, Ill. The Red Streak carbide tipped shell end mills are available with negative radial and axial rakes for milling steel, and zero rakes for milling cast iron, non-ferrous and non-metallic materials.

PEDESTAL-TYPE CENTRIFUGAL PUMPS

NEW line of cast iron bronze-fitted, pedestal-type centrifugal pumps, known as "Pedrifugal" pumps, suitable for commercial washers and cleaners, large diesels, machine tools, air conditioners, bottling and canning equipment, heat exchangers and cooling towers, is announced by Allis-Chalmers Mfg. Co., Milwaukee, Wis. Pumps come in three principal sizes, 1" x 1", 2" x 2", and 3" x 3". Capacities are from 10 to 500 gallons per minute at heads from 10 to 100 feet, with power requirements from one-quarter to 15 hp. Pumps are expressly designed for use with Texrope V-belt drives, and are all fitted with impellers of maximum diameters and will operate in any position. Variations in capacity are provided by changes in speed through sheaves of larger or smaller diameter.

INDUSTRIAL GOGGLE

RUBBER-frame goggle equipped with a large, single acetate lens and specifically designed to protect workers against chemical and dust hazards, is announced by American Optical Company, Southbridge, Mass. This goggle can be worn in combination with the company's R-1000 respirator. It provides wide-angle vision, good ventilation and wearing comfort. Most types of prescription glasses may be worn underneath. Slow burning and shatter-resistant acetate lens can easily be replaced.

(*Please turn to page* 164)

The shortest distance between your plant and steel is

Rely on these five *PURDY* extras!

STEEL TECHNICIANS—*Purdy* desk salesmen—skilled in steel—are ready at your call to recommend the correct type of steel for your job. If, due to current conditions, a temporary shortage exists, they will advise on a suitable substitute.

LARGE STOCKS—Our inventory includes the largest stocks in items carried, and heavy tonnages are coming in regularly to insure a dependable supply.

FAST DELIVERY—Non-fabricating orders are shipped out on our own fleet of trucks within 24 hours of receipt of order. Where special sizes are specified, modern, high capacity equipment insures precision work and quick handling.

SPECIAL TELEPHONE SERVICE—In New Jersey, New York or Connecticut, please check the *Purdy* phone service. Prompt, direct wire connection to A. R. PURDY CO. is available in most localities at your usual local charge.

EXPERIENCED FIELD MEN—*Purdy* field men, trained to help work out your steel problems are available for consultation. When you need advice on steel—call in a *Purdy* man.

The Planet Line of Quality Steels

STAINLESS STEELS

COLD FINISHED STEELS

SPRING STEELS

TUBING

TOOL STEELS

DRILL ROD

COLD ROLLED STRIP STEEL

PLANET

A. R. Purdy Co.

INCORPORATED

ORIENT WAY and PAGE AVENUE, LYNDHURST, NEW JERSEY

SPEED-WET* brings you RESIN-BOND PRODUCTION for dry or coolant grinding

Resin-bond production is premium production—improved speed, stamina and finish at lower cost. Why? Because each individual abrasive grain in Speed-wet resin-bonded products is twice anchored in a heat-set resin adhesive, which, once hardened, can never remelt or flow or release its grip.

When used dry, Speed-wet resin-bonded abrasives are immune to cutting heats and humidity. Used wet, they are impervious to water, cutting oils or coolants.

Thus, for dry or coolant grinding, or for polishing and finishing of metals or glass or plastics, Speed-wet resin-bond abrasives deliver extra performance. Specify Speed-wet Metalite for aluminum oxide grit—or Speed-wet Durite for silicon carbide. Metalite or Durite, they're both resin-bonded if they are marked Speed-wet*.

*Reg. U. S. Pat. Off.

BEHR-MANNING
(DIVISION OF NORTON COMPANY)
TROY, N. Y.

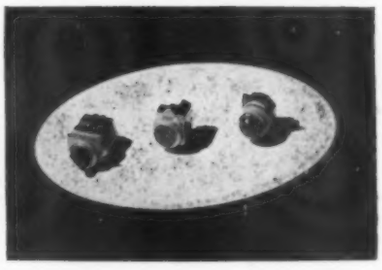
STENCIL-CUTTING MACHINE

AUTOMATICALLY fed circular stencil-cutting machine is announced by Diagraph-Bradley Stencil Machine Corp., St. Louis, Mo. Machine is available in three sizes: the Jumbo, 1¾" letters; the Model H, 1½" letters; and the Model G, 1¼" letters. Turning a screw converts the machine for straight-line stencil cutting. Models G and H cut three lines; the Jumbo cuts two lines plus a third line by hand feeding.

NON-SLIP SYNTHETIC RUBBER GLOVES

ROUGH-surface finish gloves, known as "Griptite", which permit a non-slip grip even in liquids, are announced by Surety Rubber Co., Carrollton, Ohio. The finish, an integral part of the glove is said to neither peel nor wear off. It is applied on Surseal synthetic gloves which are available in standard weights and sizes, in turn-cuff and regular gauntlet styles, and with curved or straight fingers.

OILTIGHT PUSH BUTTONS, SWITCHES AND LIGHTS, ETC.



NEW line of oiltight push-button units, selector switches, and indicating lights for machine tool and automotive industries, is announced by Control Division, General Electric Co., Schenectady, N. Y. The momentary-contact push-button units are available as single-pole unit with a normally-open and a normally-closed circuit; three-point unit with normally-open circuits with common connection; double-pole units with either normally-open or normally-closed circuits. The selector switch unit is available in single-pole double-throw, or double-pole single-throw forms. Contacts are cam operated. The indicating light units have same single-pole mounting arrangement as the push-button units and selector switches and are available for use 110-125 or 250 volts a-c- or d-c. They may be used on higher voltages with separately mounted resistors. Additional information in Bulletin GEA 4254-A.

(*Please turn to page* 166)

SAFE LOADS

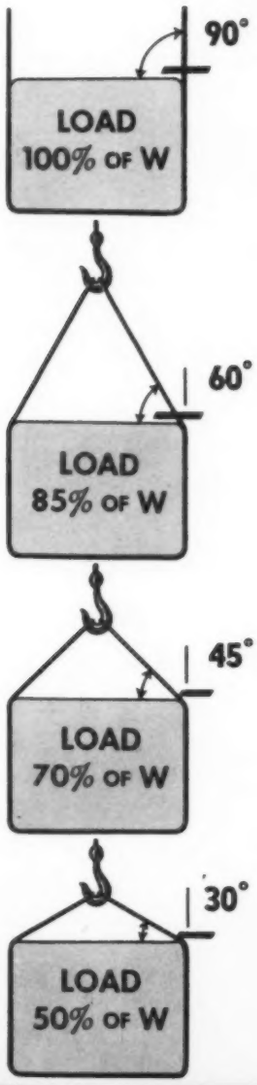
in pounds (based on Federal specification T. R. 601a for Manila rope) for new, standard lay, three strand, Manila rope slings, spliced endless.

a PLYMOUTH Lifesaver!

Life and property are indeed at stake when a rope breaks under an overload. Consult the chart below to check your load weights against the sling angles you are using. Then check the size and type of your rope against the Plymouth Rope Strength Chart on the other side. Plymouth makes fine ropes to meet every standard purpose and many specialized needs in Industry. Your own Rope Supplier probably carries Plymouth Ropes. Ask him—or write us — for complete data on How to Put Rope to Work in Industry.

Plymouth Cordage Company
Plymouth, Massachusetts

HOW THE ANGLE OF A SLING ALTERS ITS SAFE CARRYING CAPACITY



APPROXIMATE DIAMETER OF ROPE (INCHES)	SAFE LOAD FOR SINGLE-LEG VERTICAL SLING	DOUBLE (TWO-LEG) SLING DEGREE OF ANGLE WITH HORIZONTAL		
		60 DEGREES	45 DEGREES	30 DEGI
1/2	530	743	612	437
9/16	690	968	797	569
5/8	880	1,234	1,016	726
11/16	980	1,374	1,132	809
3/4	1,080	1,515	1,247	891
13/16	1,300	1,823	1,502	1,073
7/8	1,540	2,160	1,779	1,271
1	1,800	2,525	2,079	1,485
1 1/16	2,100	2,945	2,426	1,733
1 1/8	2,400	3,366	2,772	1,980
1 1/4	2,700	3,787	3,119	2,228
1 5/16	3,000	4,208	3,465	2,475
1 1/2	3,700	5,189	4,274	3,053
1 5/8	4,500	6,311	5,198	3,713
1 3/4	5,300	7,433	6,122	4,373
2	6,200	8,696	7,161	5,115

CAUTION: The age and condition of your rope, the type of object being lifted, the use or non-use of packing under the rope at sharp corners, the diameter, size and strength of the hook all affect the safe load as well as the angle or sling and new strength of the rope. These tables show you how the angle of a sling alters safe carrying capacity. The sketches, at left, show this relationship in percentages. The columns of figures are based on new rope, in three tests over a 2" pin. Your conditions of use may be different. BE SAFE! These figures are for guidance only. Use good judgment and determine the size of rope to use only after consideration of the actual working conditions.

ROPE SIZES and STRENGTHS

NOTE: *These specifications are for three strand rope with standard lay. To figure safe loads use at least a 5 to 1 safety factor.*

NOMINAL SIZE			WEIGHT PER 100 FEET (NET)	LENGTH NO. OF FEET PER POUND	GROSS WGT. APPROXIMATE FOR FULL COIl	FEDERAL SPECIFICATION TR-601a (MANILA ROPE)	FEDERAL SPECIFICATION TR-631** (No. 1 SISAL ROPE)
THREADS	CIRCUMFERENCE	DIAMETER					
	Inches	Inches	Pounds	Feet	Pounds	Pounds	Pounds
6-Fine	9/16	3/16	1.40	71.6	50	450*	360*
6	3/4	1/4	1.92	52.2	50	600*	480*
9	1	5/16	2.71	36.9	50	1,000*	800*
12	1 1/8	3/8	3.77	26.5	50	1,350*	1,080*
15	1 1/4	7/16	5.15	19.4	63	1,750	1,400
18	1 3/8	15/32	6.14	16.3	75	2,250	1,800
21	1 1/2	1/2	7.36	13.6	90	2,650	2,120
24	1 3/4	9/16	10.2	9.8	125	3,450	2,760
27	2	5/8	13.1	7.65	160	4,400	3,520
30	2 1/8	11/16	14.7	6.82	180	4,900	3,920
33	2 1/4	3/4	16.4	6.12	200	5,400	4,320
	2 1/2	13/16	19.1	5.23	234	6,500	5,200
	2 3/4	7/8	22.0	4.54	270	7,700	6,160
	3	1	26.5	3.78	324	9,000	7,200
	3 1/4	1 1/16	30.7	3.26	375	10,500	8,400
	3 1/2	1 1/8	35.2	2.84	432	12,000	9,600
	3 3/4	1 1/4	40.8	2.45	502	13,500	10,800
	4	1 5/16	46.9	2.13	576	15,000	12,000
	4 1/2	1 1/2	58.8	1.70	720	18,500	14,800
	5	1 5/8	73.0	1.37	893	22,500	18,000
	5 1/2	1 3/4	87.7	1.14	1,073	26,500	21,200
	6	2	105.	.949	1,290	31,000	24,800
	6 1/2	2 1/8	123.	.816	1,503	36,000	28,800
	7	2 1/4	143.	.699	1,752	41,000	32,800
	7 1/2	2 1/2	163.	.612	2,004	46,500	37,200
	8	2 5/8	187.	.534	2,290	52,000	41,600
	8 1/2	2 7/8	211.	.474	2,580	58,000	46,400
	9	3	237.	.422	2,900	64,000	51,200
	9 1/2	3 1/8	264.	.379	3,225	71,000	56,800
	10	3 1/4	292.	.342	3,590	77,000	61,600
	11	3 1/2	360.	.278	4,400	91,000	72,800
	12	4	427.	.234	5,225	105,000	84,000

ndards: Smaller sizes of ropes are usually ordered by the number of threads, larger sizes by circumference. 6, 9, and 12-thread rope is packed in standard and 50 lb. coils. All larger sizes are put up in full coils of 200 fathoms—in half ils of 100 fathoms. One fathom equals six feet.

*IN THE FOUR SIZES INDICATED BY A STAR, present-day Plymouth Manila Rope and Plymouth Sisal Rope have a minimum breaking strength slightly under that shown in the Federal Specification (TR-601A) columns.

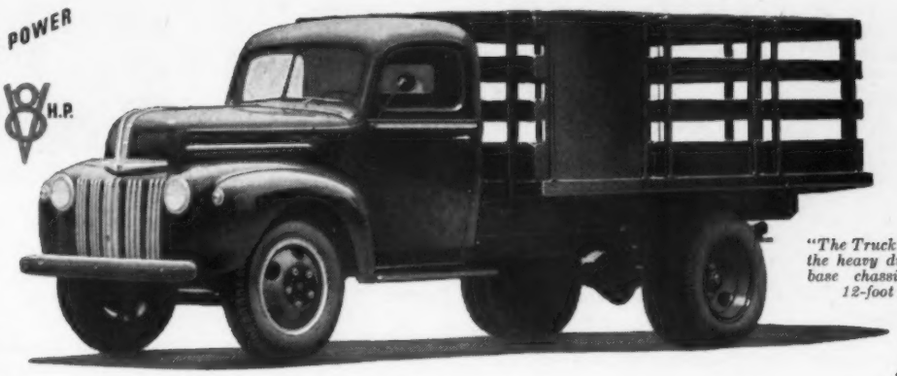
**The figures shown in this column are 80% breaking strength of Manila rope. Federal Specification TR-631 Amendment 2, dated March 15, 1944 permits this minimum breaking strength to be reduced to 75% of that of Manila.

FREE! Plymouth will gladly mail you upon request additional copies of this valuable chart for every department of your ant or shop where rope is used. Foremen and workers will find it useful in otecting life and property—saving rope—cutting costs!

YMOUTH CORDAGE COMPANY, PLYMOUTH, MASSACHUSETTS. DISTRICT OFFICES: BOSTON, NEW RK, CHICAGO, HOUSTON, SAN FRANCISCO. WAREHOUSE STOCKS: NEW YORK, BOSTON, PHILA-LPHIA, BALTIMORE, HOUSTON, CHICAGO, SAN FRANCISCO. IN CANADA: SALES OFFICE—CORDAGE DISTRIBUTORS, LTD., TORONTO. MILL—WELLAND, ONTARIO.

REGISTRATIONS *SHOW* IT—OPERATORS *KNOW* IT!

90 H.P. 6 YOUR PICK OF POWER 100 H.P. V-8



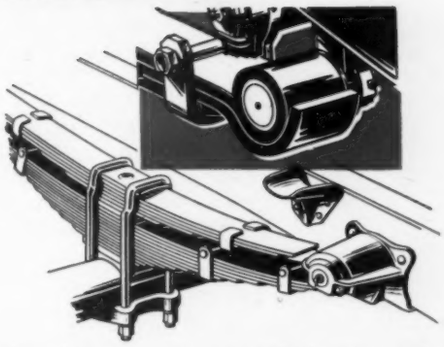
"The Truck of a Thousand Tasks"—the heavy duty 1½-ton, 158" wheelbase chassis with standard Ford 12-foot Platform Stake body.

"FORD TRUCKS LAST LONGER!"

ONE big reason:

FORD SPRINGS STAND UP!

Ford spring engineering provides unsurpassed endurance. Ford special alloy spring steel, with tensile strength of 200,000 pounds per square inch, assures high fatigue resistance, while deflection rates scientifically proportioned to each vehicle's gross weight assure good riding with generously ample load capacity. Long-wearing shackle bushings of steel-backed bronze reduce maintenance expense. Ford special, wrapped "safety eyes" on heavy duty front springs (illustrated) reduce stress on main leaves, afford longer life and extra safety. Hydraulic *double-acting* shock absorbers on light duty models further ease the ride and control the load.



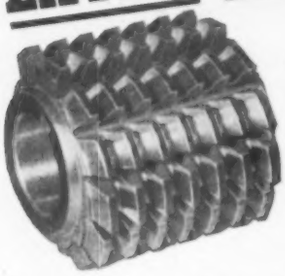
Ford

ONLY FORD GIVES YOU ALL THESE LONG-LIFE TRUCK FEATURES: Your choice of two great engines, the 100-H.P. V-8 or the 90-H.P. Six—semi-centrifugal clutch that needs no maintenance lubrication—rear axle design that takes all weight-load off the shafts (¾-floating in half ton units, full-floating in all others)—heavy channel section frames, *doubled* between springs in heavy duty models—big, easy-action brakes, with heavy, cast drum surfaces, non-warping and score-resistant—extra-thick sheet metal in cabs, cowls, skirts and fenders—all told, more than fifty such examples of Ford endurance-engineering. That's why FORD TRUCKS LAST LONGER . . . why 7 out of 11 of all Ford Trucks built since 1928 are still in service. No wonder the average age of all Ford Trucks in use is nearly 9 years! Stamina is built into them! See your Ford Dealer NOW!

FORD TRUCKS

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE

EXTRA TOOL LIFE .... Free



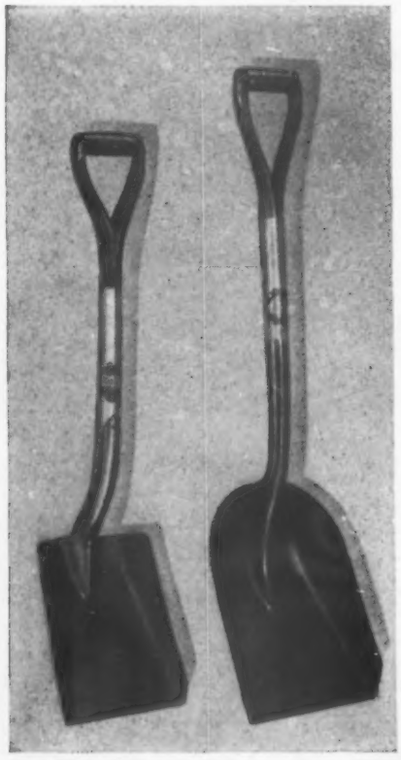
"Another company copied one of your hobs so exactly that we couldn't find the slightest difference under a comparator or as to analysis and hardness. But, on the job, not one of them did better than one-half the production of the Michigan hob!" (From a user's report).

We are not surprised. They did not duplicate the freedom from carbide segregation in Michigan gear cutting tool steels. This freedom means:

1. **Stronger body and teeth—no weak spots**
2. **Better sharpening—less stock removal—more grinds per tool**
3. **Smoother cutting—no jagged edges**
4. **More pieces per grind—cutting edges hold up longer.**

Are you on the mailing list for "GEAR HIGHLIGHTS"? Published regularly as a service to gear users and producers.

MICHIGAN TOOL COMPANY
7171 E. McNICHOLS ROAD • DETROIT 12, U. S. A.



All blades finished now black except Molders' Shovels and Grain Scoops, which may be furnished with either face or back polished.

Say
"HELLO"
To THESE
GOOD BUYS
in
SHOVELS

Get acquainted — right now — with Ingersoll shovels. The *only* shovels, spades and scoops made of Tem-Cross Tillage Steel — with blade edges GUARANTEED NOT TO SPLIT. Electrically heat-treated for springy ruggedness. Smooth polished hardwood handles. Specify Ingersoll — "A Borg-Warner Product" — for *all* your shovel needs.

INGERSOLL STEEL DIVISION
Borg-Warner Corporation
New Castle, Indiana

Plants: New Castle, Ind.; Chicago, Ill.; Kalamazoo, Mich.

INGERSOLL *Shovels*

INFRA RED LAMPS

ILLUSTRATION shows 250-watt, 375 watt and new 500 watt size infra-red industrial lamps announced by the G. E. Lamp Department, Nela Park, Cleveland. The two smaller lamps, each with G30 bulb, designed especially for use in open reflector ovens, are interchangeable. The 500 watt lamp is equipped with medium bipost base and 6-inch flexible leads. Its T-40 bulb is made of hard glass.

CORRUGATED PAPER CARTON SEALER

NEW synthetic rubber base adhesive, known as U. S. Royal Adhesive M6165, to speed up packaging operations and lower production costs, is announced by U. S. Rubber Co., Rockefeller Center, New York. Adhesive produces a permanent bond, resistant to extremely high and low temperatures, and may be applied with a spray gun. Company says only small quantity is required for each carton.

PORTABLE BUTT WELDER

PORTABLE flash butt welder designed for production welding of bar and round stock up to 5/16" dia., announced by the DoAll Co., 1301 Washington Ave. S., Minneapolis 4, Minn., is finding multitude of uses such as repairing small tools, butt welding tool bit extensions and shanks and joining band saw blades from 1/16" to 1¼". In addition to welding, annealing and flash dressing, an etching attachment provides a means for permanently identifying tools, templates, attachments, etc. Unit is designed for standard a-c 220 v single phase 50/60 c operation, pedestal type or in metal carrying case. Model can be supplied for other voltage requirements.

(Please turn to page 168)

BEARING FACTS NO. 1

The Cylindrical Roller Bearing

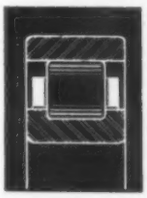
AS PRODUCED BY NORMA-HOFFMANN

USE THIS BEARING WHERE NO OTHER ANTI-FRICTION BEARING WILL STAND UP:

- HIGH SPEEDS
- PLUS HEAVY LOADS
- PLUS TEMPORARY OVERLOADS
- PLUS SHOCK
- PLUS VIBRATION

NORMA-HOFFMANN PRECISION ROLLER BEARINGS GUARANTEE YOU:

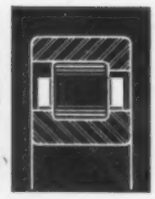
- LARGER SHOCK-ABSORBING CAPACITY THAN ANY OTHER TYPE SINGLE-ROW BEARINGS.
- MARGIN FOR 50% OVERLOADS.
- LOWER FRICTION COEFFICIENT UNDER HEAVY LOAD THAN ANY OTHER TYPE BEARING.
- SPEEDABILITY EQUAL TO ANY BALL BEARING, SIZE FOR SIZE, UP TO 35,000 R.P.M.
- 100% MACHINED, EXTRUDED BRONZE CAGE OF MAXIMUM DENSITY AND UNIFORMITY.



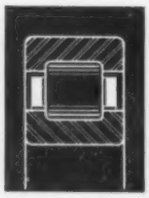
"R" Type: For heavy radial load and axial float. Straight outer ring, two-lipped inner ring.

FIVE STANDARD TYPES of cylindrical roller bearings are shown in cross-section below. Other variations of this type are also available. Metric and inch sizes up to 22½" bore.

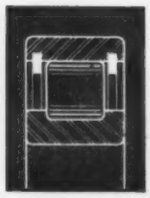
"R-E" Type: For heavy radial load and axial float. Two-lipped outer ring, straight inner ring.



"R-L" Type: For heavy radial load and one-direction axial location. One-lipped outer ring, two-lipped inner ring.



"R-LL" Type: For heavy radial load and two-direction axial location. Two-lipped outer ring, two-lipped inner ring.



"R-RR" Type: For heavy radial load. Full-roller retainerless type with snap rings.

"NORMA-HOFFMANN"

PRECISION BALL, ROLLER AND THRUST BEARINGS

NORMA-HOFFMANN BEARINGS CORPORATION
STAMFORD, CONNECTICUT
FIELD OFFICES: New York, Chicago, Cleveland, Detroit, Pittsburgh, Cincinnati, Los Angeles, San Francisco, Portland, Ore., Seattle, Phoenix

Watch this Electric Hoist cut handling costs

SEE the speedy Meteor in action and you'll agree that materials handling costs are down for the full count. This heavy duty electric hoist is an outstanding performer . . . a time and money saver. Helical gears, airplane type cooling, low headroom, thermal protection, only 110 volts at push button station . . . and speed . . . are but a few of the Meteor's notable features. Bulletin 142 will tell you about all of them. Better still, the Meteor itself will bring you all of them.

Capacities from ½ ton and up. Lifting speeds from 18 to 60 feet per minute.

CHISHOLM-MOORE
HOIST CORPORATION
(Affiliated with Columbus-McKinnon Chain Corporation)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles

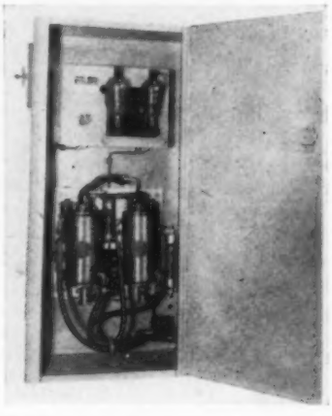
PORTABLE FIRE EXTINGUISHER

NEW stored-pressure hand extinguisher is announced by Union Stop - Fire Corp., Brooklyn, N. Y. Extinguisher is suspended by a shoulder sling from operator's neck or shoulder, leaving both hands free to direct hose in any direction. Control valve, regulating stream, is easily turned on or off. Effective range of stream is 15 to 25 feet. Chemical used is carbon dioxide combined with carbon tetrachloride. A pressure gage indicates fluid pressure at all times.

NEW SPARK PLUG TYPES

TWO new type spark plugs especially suited to marine use are announced by The Electric Auto-Lite Co., Toledo, 1, Ohio. A new series of "Transport Plugs", designed for long life and arduous service, feature alumina insulators and oversize electrodes and will be available in 14 mm., 18 mm., and ⅞"-18 thread sizes. Second series is a line of shielded automotive plugs which in combination with a newly developed synthetic rubber grommet connector will provide a water and explosion-proof plug set-up.

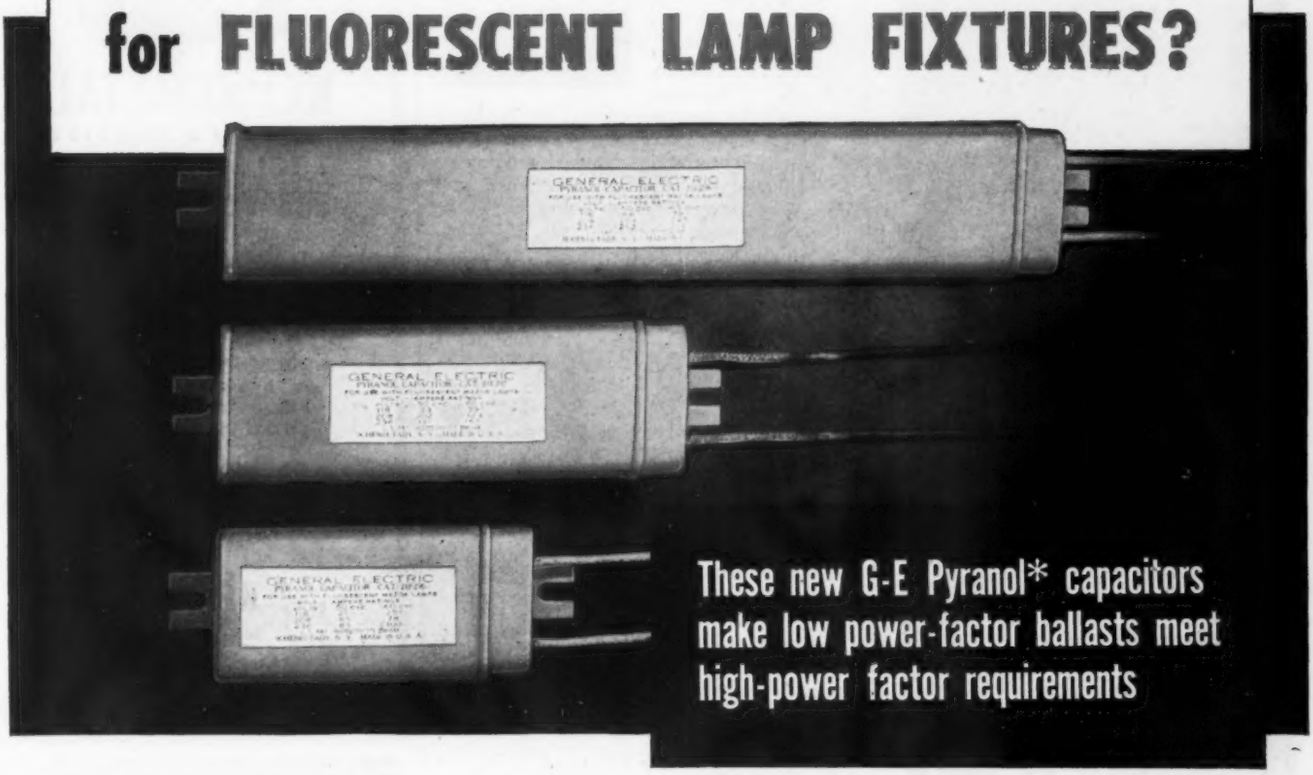
RESISTANCE WELDING CONTROLS



NEW line of non-synchronous electronic welding control combinations is announced by Control Division, General Electric Co., Schenectady, N. Y., designed to meet the new NEMA standards for resistance welding controls. It includes combinations of ignitron contactors and sequence-weld timers, with or without electronic heat control, all mounted in a single cabinet. Cabinet can be mounted on right-hand side of welding machine or placed on the floor alongside the welding machine. By adding an extension cable, the control station may be mounted at the machine while the main control panel is located at a distance.

(*Please turn to page* 170)

need POWER-FACTOR IMPROVEMENT for FLUORESCENT LAMP FIXTURES?



If your present supply of high-power-factor ballasts is inadequate for your high-power-factor fixture requirements, use the new G-E Type FL capacitors.

These new Type FL capacitors**, when simply installed in the fixture with available ballasts, bring low-power-factor equipment up to acceptable power-factor levels.

The size and weight of these new capacitors permit easy assembly in new or existing fixtures. A short shipping schedule on Type FL capacitors make them available for current fixture business—*now—when you need them.*

These hermetically sealed Pyranol impregnated units, featuring new low cost as well as small, light-weight design, offer the same high quality as millions of G-E capacitors now used in fluorescent installations.

Three designs are available for operation at 50 or 60 cycles, 118, 208 or 236 volts a-c, and when used individually, or in combinations as suggested, provide a minimum of 85 to 95 percent power factor for a single 15-watt lamp, or up to four 40-watt lamps. For further details, write to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

***Listed by Underwriters' Laboratories, Inc.*

DATA FOR 60 CYCLE, 118 VOLTS A-C

Lamp Size Watts	1 Lamp	Approx. P-F	2 Lamps	Approx. P-F	3 Lamps	Approx. P-F	4 Lamps	Approx. P-F
15-T-8	S	95	M	86	L	95+	L	86
15-T-12	S	86	S & M*	95+	L	88	S & L*	87
20-T-12	S	90	M	85	M & L*	91	L	85
30-T-8	M	85	L	85	M & L*	86	L & L*	86
40-T-12	M	86	L	86	M & L*	86	L & L*	86

Symbols: S—Cat. No. 21F296; M—Cat. No. 21F297; L—Cat. No. 21F298 *Two capacitors in parallel

VOLT-AMPERE RATINGS

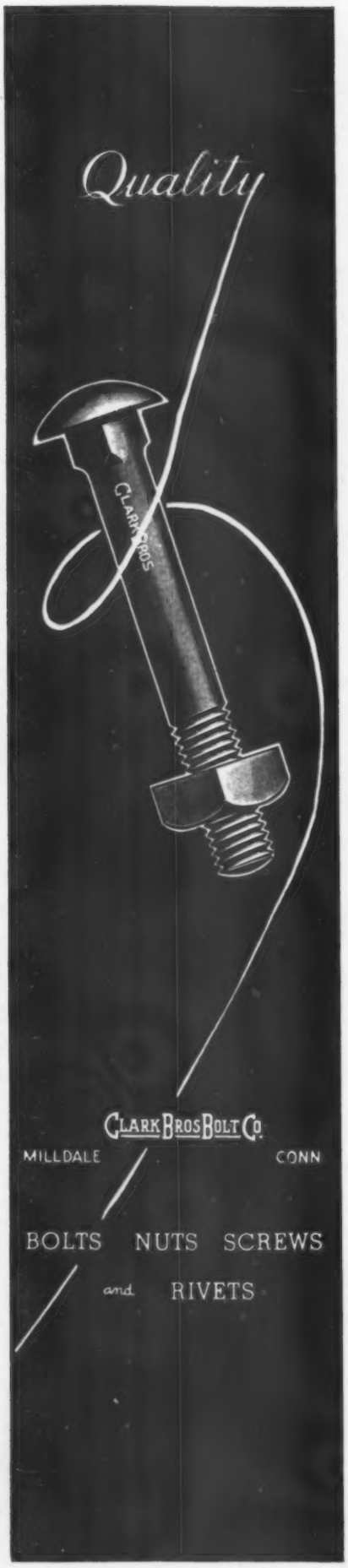
Volts A-C	21F296		21F297		21F298	
	50 Cycle	60 Cycle	50 Cycle	60 Cycle	50 Cycle	60 Cycle
118	21	25	33	39	66	78
208	65	78	102	123	204	245
236	83	100	131	157	262	314

GE F-L Capacitors

*Pyranol is General Electric's registered trade name for a noninflammable liquid dielectric for capacitors.

GENERAL ELECTRIC

407-110-5700



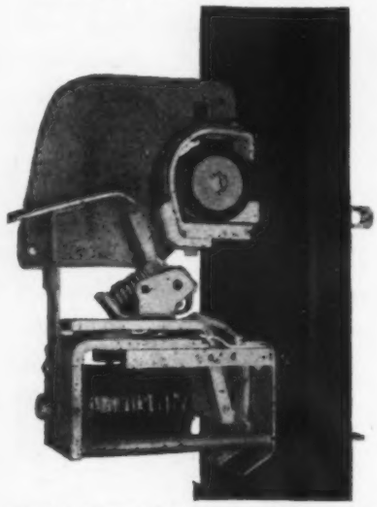
WIRE STRIPPING MACHINE

CODECO wire stripping machine, which cuts, strips, and slits one, two and three conductor wire up to one-half inch diameter, is announced by Williams Products Co., Middletown, Conn. Stripper operates by compressed air, 60 lbs pressure sufficing to process most cord. Stripped material is removed automatically. Little maintenance is required and the machine requires no bolts, screws or lugs. Measurements: 18" wide, 11" deep, 25" high, weight 75 lbs. Folder available.

MASTER CHECKING DIAL INDICATORS

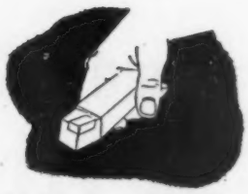
SERIES of extremely sensitive and accurate master checking dial indicators, called the "Super", for toolroom and production line use, is announced by B. C. Ames Co., Waltham, 54, Mass. Overall bezel diameters are 2¼" and 2¾". Graduations are .0001". Range is .008"—with the dial either balanced (4-0-4), or continuous (1-0-1). Indicator can follow variations in dimensions as small as one-hundred thousandth of an inch (.00001"). The practical readable accuracy is ¼ of a division (¼ of one ten-thousandth or .000025"). Outside diameters are in accordance with American Gauge Design Committee standards.

D-C MILL TYPE CONTACTOR



IMPROVED line of d-c mill-type contactors designed for use in marine, steel, mill and similar heavy-duty applications is announced by Control Division, General Electric Co., Schenectady, N.Y. There are nine contactors in the line, all of similar construction ranging in capacity from 100 to 2500 amperes. Two are of normally-closed construction and the rest normally-open. All parts can be serviced and inspected from the front of the control panel without removing the contactor. Frames and armatures are of cold-rolled steel.

(*Please turn to page* 172)



KENNAMETAL
CEMENTED CARBIDE
TOOLS, BLANKS, and SPECIALTIES

- **FOR FAST, ACCURATE METAL-CUTTING . . .** complete selection of single-point tools and milling cutters.
- **RESIDENT TOOL ENGINEERS** in 24 cities available for expert help in proper selection and correct use.
- **WAREHOUSES** in Chicago, Cincinnati, Los Angeles, New York, and San Francisco to expedite delivery.

KENNAMETAL
SUPERIOR CEMENTED CARBIDES
KENNAMETAL Inc., LATROBE, PA.

Magnesium Castings Are Available Now

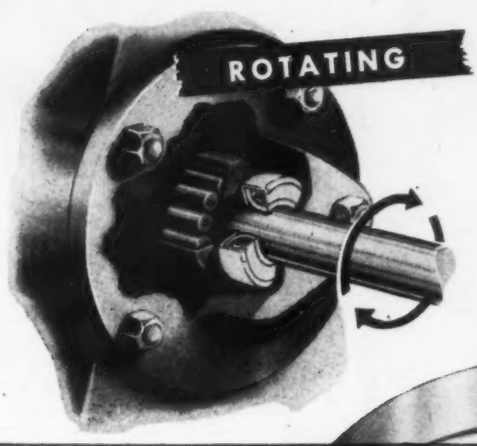
OFTEN AT EQUAL OR LESS COST

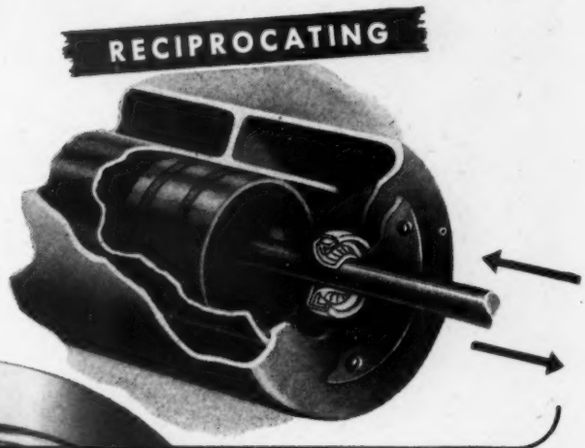
Because of their excellent machining qualities, Magnesium castings often cost less than finished castings of other metals. We make Magnesium alloy castings of all sizes, from a fraction of an inch up to six feet in diameter for a variety of uses, including aircraft, textile machines, office equipment, scales, fish line manufacturing, vacuum cleaners and toys. Why not investigate the possibilities of using Magnesium?

Write for complete information to

UTICA RADIATOR CORPORATION
Magnesium and Aluminum Castings
UTICA 2, N.Y.

The Simple Effective Way to Seal Shafts





"PERFECT" Oil Seals

PATENTED

THEY DO:	THEY DO NOT:
1—Retain lubricant	1—Permit entrance of foreign matter
2—Prolong bearing life	2—Need adjustment or attention
3—Reduce bearing maintenance	3—Rotate with the shaft
4—Use little space	4—Wick lubricant away from bearing
5—Cost very little	5—Score the shaft

Consult Chicago Rawhide Engineers for Specific Application Information

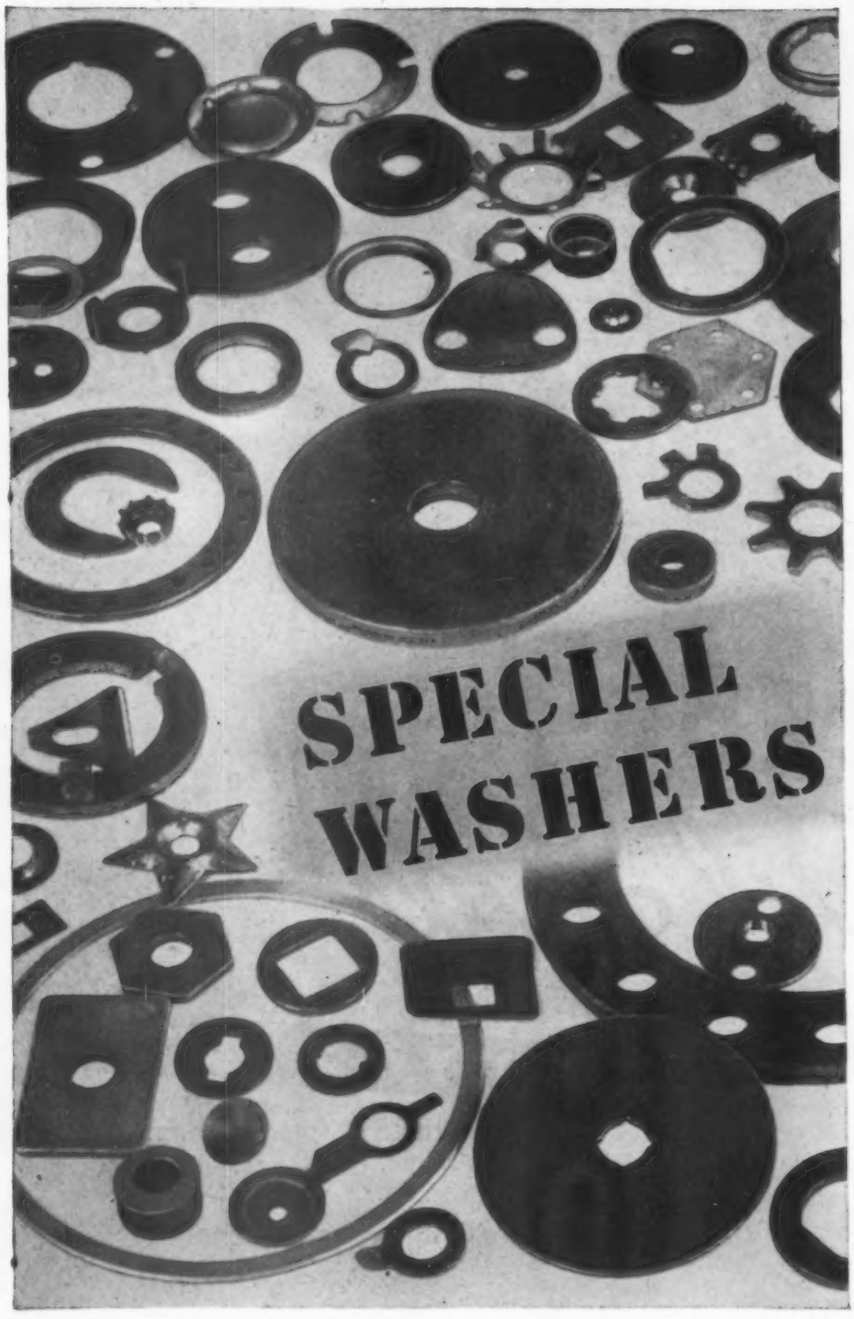
25

CHICAGO RAWHIDE MANUFACTURING COMPANY

1318 ELSTON AVENUE • CHICAGO 22, ILLINOIS

PHILADELPHIA • CLEVELAND • NEW YORK • DETROIT • BOSTON • PITTSBURGH • CINCINNATI

67 YEARS MANUFACTURING QUALITY MECHANICAL LEATHER GOODS EXCLUSIVELY AND NOW SIRVENE SYNTHETIC PRODUCTS



. . . to Your Specifications

Any Size — Any Metal — Any Quantity

For more than a quarter-century we have been specializing in the design and production of Special Washers and Small Stampings. We can place at your disposal more than 10,000 sets of tools—and if none of these meets your requirements, our experienced Tool & Die Department will gladly work to your specifications.

THE MASTER PRODUCTS CO.
6400 PARK AVENUE • CLEVELAND 5, OHIO

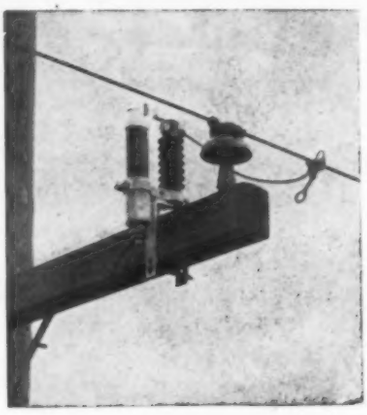
ROTATING PAN-TYPE MIXER

NEW rotating pan-type mixer, for mixing, blending, tumbling, polishing, finishing and similar operations, is announced by Ransome Machinery Co., 1449 E. 2nd St., Dunellen, N.J. Pan is motor-tilted and motor-rotated at constant speed. Variable speed drive also available. Tilting range is 135°. Unit is operated by remote push-button control. Available in sizes up to 2500 lbs. (50 cu. ft.) batch capacity.

SOLDERLESS TAPELESS WIRE CONNECTOR

NEW universal "4-in-1" solderless and tapeless bakelite wire connector, designed for making fixture joints, roughing-in joints, sign wiring and joints in electrical equipment or machinery, is announced by Holub Industries, Inc., Sycamore, Ill. It is approved by Underwriters' Laboratories, for joining 46 different wire combinations ranging from two No. 18 to four No. 14 with one No. 18 or two No. 12 with one No. 16, solid or stranded wires.

LIGHTNING ARRESTER



NEW heavy-duty expulsion-type arrester known as Hi-Stroke Rural Arrester, for lightning protection on rural lines, is announced by Transformer Division, General Electric Co., Schenectady, N. Y. Arrester is available in 6- and 9-kv ratings and can be provided with different mounting hangers, either alone or for combination mounting with enclosed or open type fuse cutouts. Bulletin GEA-4582 on Hi-Stroke rural arresters available on request from Apparatus Dept., G-E Co., Schenectady, 5, N. Y.

(*Please turn to page* 174)

WHY DAYTON V-BELTS *Eliminate Vibration*

NO VIBRATION! NO BREAKDOWNS!
in 12 years of beating paper into pulp

In the plant of a large eastern boxboard mill, five huge beaters reduce old cardboard and corrugated paper into pulp. It's a rough, dusty, tough job. The first of these five beaters, installed over 12 years ago, was equipped with a drive that frequently broke due to excessive vibration and shock-starts and stops. Something had to be done. A Dayton V-Flat Drive was installed, using the original large flat pulley. Smooth starting and stopping and absence of vibration immediately put an end to breakdowns and reduced machine maintenance to a minimum. Naturally, as *new* beaters were installed they were all equipped with Dayton V-Belt Drives.

Dayton V-Belts eliminate vibration because their engineered resilience and the smooth, easy way they seat themselves in the pulley grooves absorbs any motor or machine vibration, or sudden jerks or jars caused by an uneven load condition. Elimination of vibration is one of many reasons why Dayton V-Belts can help you solve your power transmission drive problems efficiently and economically. Your Dayton Distributor will gladly tell you the full story. Call him today.

THE DAYTON RUBBER MANUFACTURING COMPANY
DAYTON 1, OHIO

Branch Offices: Atlanta • Boston • Chicago • Cleveland Cincinnati • Dallas • Dayton • Detroit • Los Angeles Minneapolis • New York • Philadelphia • St. Louis

The shocks of suddenly applied power are absorbed by Dayton V-Belts seating themselves further down in the pulley grooves. Any motor or machine vibration is absorbed by the engineered resilience of Dayton V-Belts.

V-BELT BUYERS! A leading mill supply house near you stocks Dayton V-Belts.. Look for the name in the yellow pages of your telephone directory

Dayton Rubber

THE MARK OF TECHNICAL EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

THE WORLD'S LARGEST MANUFACTURER OF V-BELTS

SPRAY TYPE WASHER

NEW spray type washing machine for washing of parts on racks, is announced by Optimus Equipment Co., 223 Church St., Matawan, N.J. Unit can be placed on the floor, pit or cement work being unnecessary.

Top of unit is at working height. Machine can be used with submerged agitation to remove caked grease such as Tripoli compound and abrasives. Can be used individually or in series where operation requires several steps, such as solvent wash, rinse, alkali wash, and rinse.

TORQUE-DRIVEN TAPPING ATTACHMENT

TORQOMATIC, an universally adaptable torque-driven tapping attachment, is announced by Charles L. Jarvis Co., Middletown, Conn. It is available in three sizes and will tap from soap to copper or chrome nickel steel without appreciable increase of finger tip pressure. It is available in standard and built-in models and can be furnished to fit any drill press or tapping machine. Eight-page illustrated folder available.

INDUCTION HEATING EQUIPMENT

THE "Tocco" Heat Gun, (illustrated) a new portable inductor; a 30,000 cycle motor generator type induction heating unit; a new variable ratio transformer, and a 7½ KW output, 3 megacycle induction heating unit, are announced by The Tocco Division of The Ohio Crankshaft Co., Cleveland, Ohio. The heat gun is a portable inductor which permits taking the heat to the work. It is particularly adaptable to large assemblies where many spot heats are required. It has been used with leads up to 20 feet. It is built for operation with standard 10,000 cycle motor-generator type induction heating unit. The 30,000 cycle Tocco machine triples the previous high frequency limit of motor-generator type induction heating equipment. The new variable ratio transformer was designed to increase the adaptability of motor generator type induction heating equipment, and one transformer is suitable for all jobs. The new 7½ KW output electronic type heating unit is designed to increase efficiency on heating parts of very small diameter or very thin strip stock.

SHOCKPROOF LIGHTWEIGHT, BOTTLE CARRIER

PROTECTIVE bottle carrier, lightweight and shockproof, designed to carry glass bottles containing such chemicals as acids, caustics, dyes, stains, inks etc., is announced by U. S. Rubber Co., Rockefeller Center, New York, N. Y. The carrier is available in two sizes—a gallon size and a five-pint or two-liter size. The outer bag is made of heavy duck, impregnated on both sides with chemical-resistant synthetic rubber. A locking device on the drawstring keeps the carrier closed and prevents splashing. A sponge rubber shockproof pad protects the bottom against blows, and tubular sponge rubber side padding completely surrounds the bottle.

LIGHTWEIGHT HAND TRUCK

NEW general service hand truck made of aluminum alloy castings is announced by Thermoid Co., Trenton, 6, N. J. Truck is 53″ high, 18″ wide, and equipped with 9″ solid rubber-tired rolling ball-bearing wheels. A long 7″ steel nose makes "breaking" a load easier.

SAPPHIRE DIAMOND POLISHING COMPOUND

DIAMOND polishing compound, said to effect labor economies ranging as high as 50%, is announced by Sapphire Products Division, Elgin Watch Co., Aurora, Ill. Features of new compound include: close-graded virgin diamond powder composition; perfect dispersion provided by paste vehicle; and color identification of each grade. Use of compound does not necessitate special tools or laps.

FORMED STEEL CASTER

NEW caster named the "Scout", first of a formed steel No. 33 series, designed for light and medium duty service on light trucks, dollies, portable equipment, etc., is announced by Rapids-Standard Co., Inc., Grand Rapids, Mich. Features include: rugged ⅛″ steel top plate, double ball race assembly, freedom from dirt interference and longer swiveling life. Caster is manufactured in swivel and riged models, equipped with a hard or soft tread moulded-rubber Rapids-Standard 3½″ wheel. Top plate size: 2½″ by 3⅝″. Overall height of caster: 4 11/16″. Capacity load rating: 125 to 250 lbs. Inquiries invited. Dept. CA-77.

Where to buy

ESNA

ELASTIC STOP NUTS

INDUSTRIAL JOBBERS

COLORADO: M. L. Epss, Inc., 1901 Arapahoe St., Denver. **CONNECTICUT:** C. S. Mersick & Co., 260 State St., New Haven. **ILLINOIS:** Supplies, Inc., 564 West Adams Street, Chicago; Globe Machinery & Supply Co., 617 Fifteenth St., Moline. **INDIANA:** The Central Rubber & Supply Co., 120 South Meridian St., Indianapolis. **IOWA:** Globe Machinery & Supply Co., 205 Third Ave., S. W., Cedar Rapids; Globe Machinery & Supply Co., East First St. & Court Ave., Des Moines. **KENTUCKY:** Neill-LaVielle Supply Co., Inc., 506 West Main St., Louisville. **MARYLAND:** Carey Machinery & Supply Co., 119 East Lombard St., Baltimore. **MASSACHUSETTS:** Chandler & Farquhar Co., 900 Commonwealth Ave., Boston; J. Russell & Co., Inc., 361 Dwight St., Holyoke; Brierly, Lombard & Co., Inc., 107 Foster St., Worcester. **MICHIGAN:** The Charles A. Strelinger Co., 149 East Larned St., Detroit. **MINNESOTA:** Kelley-How-Thompson Co., 309 South Fifth Ave., Duluth; Kulseth Supply Co., 117 Washington Ave., Fargus Falls; Minneapolis Iron Store, 524 North Washington, Minneapolis; Uptown Iron Store, 918 West Lake St., Minneapolis; Berg Supply Co., Willmar. **MISSOURI:** The Paeth Co., 1608 McGee St., Kansas City. **MONTANA:** Kelley-How-Thompson Co., Billings. **NEW JERSEY:** Brodhead-Murphy Co., 525 West Grand St., Elizabeth. **NEW YORK:** Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo; A. N. Nelson, Inc., 370 Hamilton Ave., Brooklyn; Keystone Nut & Bolt Co., 62 Murray St., New York City; Syracuse Supply Co., 314 West Fayette St., Syracuse. **NORTH DAKOTA:** Empire Supply Co., Fargo; Minot Supply Co.,Minot; Grand Forks Supply Co., Grand Forks. **OHIO:** The E. A. Kinsey Co., 331 Fourth St., West Cincinnati; Strong, Carlisle & Hammond Co., 1392 West 3rd St., Cleveland; The Smith Brothers Hardware Co., 580 North Fourth St., Columbus; The M. D. Larkin Co., 115 East Third St., Dayton; Mill & Factory Supply Co., 622 Southard St., Toledo. **PENNSYLVANIA:** Emco Supply Co., Lansford; Standard Shannon Supply Co., 13 Letitia St., Philadelphia; Somers, Fitler & Todd Co., 327 Water St., Pittsburgh; E. Keeler Co., 238 West St., Williamsport. **RHODE ISLAND:** The Congdon & Carpenter Co., 405 Promenade St., Providence. **SOUTH CAROLINA:** Taylor Parker Co., Florence. **SOUTH DAKOTA:** Aberdeen Supply Co., Aberdeen; Cave Supply Co., Watertown. **TEXAS:** Peden Iron & Steel Co., 700 North San Jacinto St., Houston. **VIRGINIA:** Taylor Parker Co., Inc., 47 Commercial Place, Norfolk; Taylor Parker Co., Inc., 801 East Carey St., Richmond. **WASHINGTON:** Northwest Nut & Bolt Co., 4502 Fourteenth Ave., N. W., Seattle. **WEST VIRGINIA:** Superior Sterling Co., 200 Bluefield Ave., Bluefield. **WISCONSIN:** John Pritzlaff Hardware Co., 333 North Plankinton Ave., Milwaukee.

SALES OFFICES AND SALES ENGINEERS

A. K. Whitaker, 4076 Powers Ferry Rd., N.W., **ATLANTA,** Ga.; W. A. Lefler, 4922 Ivanhoe Ave., **BALTIMORE,** Md.; 20 North Wacker Drive, **CHICAGO,** Ill.; 1836 Euclid Ave., **CLEVELAND,** Ohio; 522 New Center Bldg., **DETROIT,** Mich.; 621 Merchants & Manufacturers Bldg., **HOUSTON,** Tex.; Collins-Powell Co., 9247 Alden Dr., Beverly Hills, **LOS ANGELES,** Calif.; 115 Broadway, **NEW YORK CITY;** H. J. Forst, 225 Catalpa Place, **PITTSBURGH,** Pa.; 2330 Vauxhall Rd., **UNION,** N. J. In **CANADA:** A. J. Campbell & Co., Box 430 (Place d'Armes), Montreal.

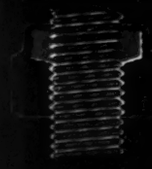
The ESNA advertisement shown opposite this column explains the dependable protection provided by all types of Elastic Stop Nuts.

THE FAMOUS *Red Elastic Collar* IS A SYMBOL OF SECURITY

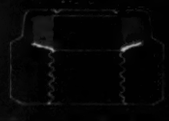
The RED ELASTIC COLLAR is . . .

PERMANENTLY CLINCHED to prevent turning under application and subsequent operational stresses.

PERMANENTLY SECURE against vibration effects. The bolt impresses (does not cut) full contact threads.



PERMANENTLY TIGHT against moisture. Bolt threads have 100% contact in collar — and a full metal seat.



REUSABLE. The Red Elastic Collar retains its grip after repeated usage.

It makes ESNA *Elastic Stop Nuts Self-Locking, Self-Sealing and Reusable*

As a result, all ESNA Elastic Stop Nuts protect assemblies against the effects of: VIBRATION: Elastic Stop Nuts lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings. . . . CORROSION: Elastic Stop Nuts keep the working threads on the bolt and nut bright and rust-free to protect their strength and permit easy removal without damage to the bolt. . . . THREAD FAILURE: Elastic Stop Nuts dampen impact stresses and materially reduce the shocks against bolt threads that frequently cause metal fatigue. . . . LIQUID SEEPAGE: Elastic Stop Nuts produce a radial-reactive pressure against the bolt threads inside the Red Elastic Collar that makes Elastic Stop Nuts self-sealing against liquid seepage. . . . COSTLY MAINTENANCE: Elastic Stop Nuts are reusable. (Torque tests on aircraft bolts prove that adequate locking torque is maintained through 15 on-and-off cycles.) They do not deform the bolt, damage the threads, gall the finish, or rust.

This wide range of protection permits full purchasing and inventory standardization and its resultant economy. For further information address: Elastic Stop Nut Corporation of America, Union, New Jersey. Sales Engineers and Distributors are conveniently located in many principal cities.

ESNA ELASTIC STOP NUTS

TRADE MARK

INTERNAL WRENCHING

ANCHOR

WING

SPLINE

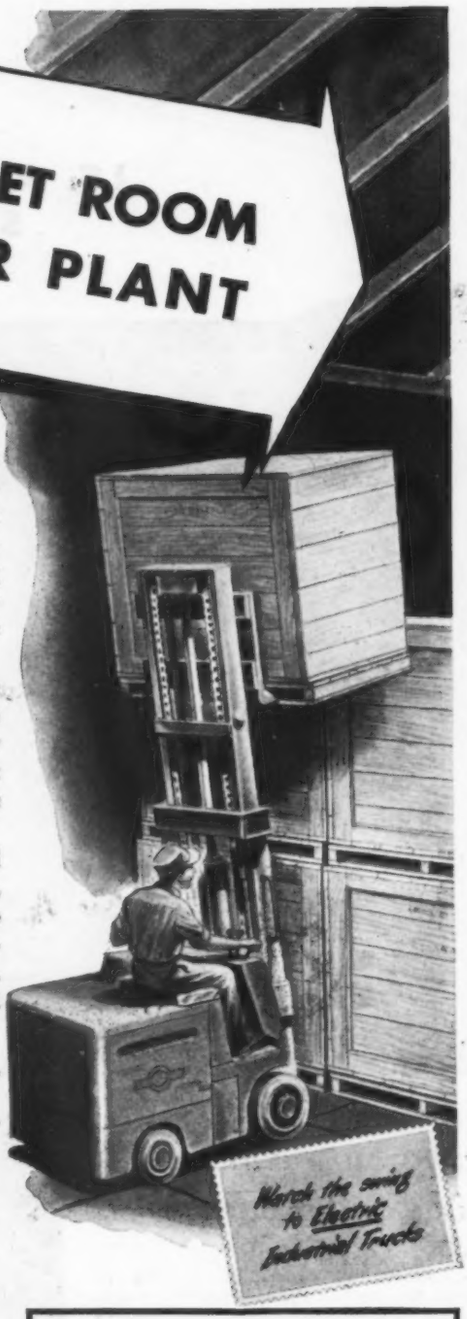
CLINCH

GANG CHANNEL

CAP

PRODUCTS OF: **ELASTIC STOP NUT CORPORATION OF AMERICA**

THE SECRET ROOM IN YOUR PLANT



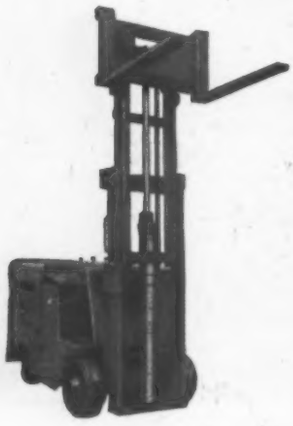
IT'S THERE — probably right where you need it most—more room for materials. Part of it may be right beside your machines. Part of it is on the loading platform where space is always at a premium. Part of it will be in your warehouse.

USE IT—that space above the five-foot-level! Clear your aisles and loading platforms. Simplify warehousing. The Crescent PALLETIER makes *vertical* space *usable* space.

The PALLETIER slips in and out of congested aisles and areas, negotiates steep ramps, steps up loading and unloading of common carriers, ends demurrage.

Send for the PALLETIER bulletin now.

CRESCENT TRUCK COMPANY
1150 Willow St. • Lebanon, Pa.
Member Electrical Industrial Truck Association



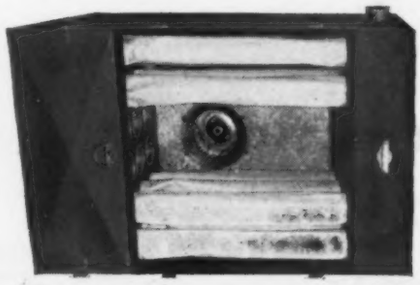
ELECTRIC Crescent PALLETIER

PALLETIER HIGHLIGHTS

- Operator spots and tiers without stirring from seat.
- All control levers at driver's fingertips.
- Full magnetic control protects against forced acceleration.
- Inspections and adjustments simplified by easy accessibility to all mechanisms.
- Minimum maintenance costs.

This is the truck to take loads off your mind.

DUST COLLECTOR & AIR FILTER



PORTABLE dust collector and air filter called the "Filtaire", designed for grinding, buffing, polishing wheels, scratch wheels, wood saws, flour mills, porcelain plants, shoe factories, textile mills, etc., is announced by Griswold-Wegner Engineering Co., 1901 East Adams St., Springfield, Ill. Units are designed to save heat loss, eliminate use of trunk lines and are said to give 100% filtering of air. They develop a velocity of over 1000 cubic feet per minute. Eight models available with motor ranges of ¾ hp to 5 hp in either drawer or hopper types.

MIDGET QUARTZ CRYSTAL OSCILLATOR

NEW midget quartz crystal oscillator, for controlling the frequency of dielectric heating and similar applications, is announced by North American Philips Co., Inc., 100 East 42nd St., New York, N. Y. Oscillator measures less than ⅝" in diameter and less than 1¼" in length, and can be mounted the same as a radio resistor. Frequency is fixed to coincide with values assigned by the F.C.C. for dielectric heating apparatus.

PLASTIC SIGNS

NEW line of engraved weatherproof plastic signs for inside and outside use is announced by Winters Stamp Mfg. Co., 102 W. Jersey St., Elizabeth, N.J. Readable white letters are engraved through a Lamicoid surface. Suggested uses are for name plates, directional indicators, room identifiers, firm names, schedules showing office and serving hours, etc. Available in several colors (white lettering) and wood finishes. Interchangeable strips can be supplied.

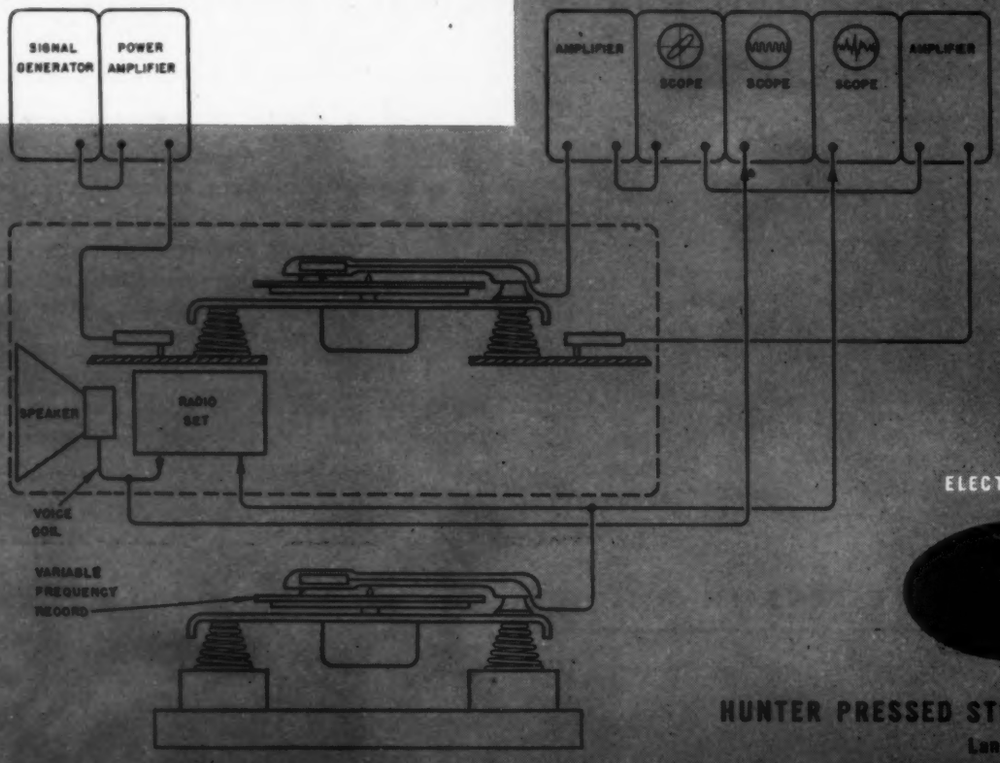
(Please turn to page 180)

How to Discourage "Back Talk" from a Loud Speaker

IN a phono-radio combination, loud speaker vibrations feed back through the mounting springs of the record player. Picked up by the tone arm, they are amplified over and over again, producing, unfortunately, noise . . . *not* music.

It is a tricky and interesting problem to design mounting springs capable of supporting the varying (1 to 10) record load yet of such flexibility that there will be little vibration over the usable audio range.

Though it is another matter to engineer (and often build) the complicated gadgets required for properly testing these springs—it's all in a day's work at Hunter. And here you see mounting springs on trial in the Hunter inspection laboratory.



SPRINGS
METAL STAMPINGS
WIRE FORMS
MECHANICAL AND
ELECTRICAL ASSEMBLIES

HUNTER PRESSED STEEL COMPANY
Lansdale, Pennsylvania

Wide inner ring ball bearing with exclusive self-locking collar for slip-fit assembly and disassembly
Single-row radial ball bearing
Prelubricated to last for years and sealed with integral steel shields
Wire spring in base for grounding electrical charges
Inch-dimension bore sizes up to 1 7/16" for popular shaft sizes.
Housing of high-grade, long-life molded synthetic rubber, into which bearing is fitted. For extra rigidity, cadmium plated steel strap is available.
Steel bushing reinforced bolt holes
FAFNIR
APPLICATIONS
Save Money
REDUCE
Noise and Vibration
FOR LIGHT-DUTY
Fafnir Rubber-Mounted Ball Bearing Units

. . . also rubber mounted flange and cylindrical cartridges

HERE'S A BEARING BARGAIN for users of small fans, heating, ventilating and air-conditioning units, small conveyor systems and other light-duty transmission equipment. In one economy-priced package you get low-starting torque to save motors, up to 10% power savings, automatic lubrication, self-maintenance and fast, simple assembly and disassembly . . . all wrapped up in a noise and vibration absorbing synthetic rubber mounting. Available in pillow blocks, flange cartridges and cylindrical units that slip-fit onto standard shafts to replace power-wasting, trouble-making plain bearings. Write for specification folder. The Fafnir Bearing Company, New Britain, Connecticut.

MOST COMPLETE LINE IN AMERICA

FAFNIR BALL BEARINGS

DOC. PAX Solves a Production Slump

Paxlanosav Heavy Duty Granulated Skin Cleanser Proves Its Value In Keeping Skilled Hands On The Job

1. "My employees work like their fingers are all thumbs. They stay home. They slow up. My profit curve looks like a weeping willow."

2. "No wonder! Looks like they were blitzed."

3. "Ah! There's most of the trouble. They get the dirt off, but brutally!"

4. "Paxlanosav Heavy Duty will help lick this problem."

5. "Simple, wasn't it? Paxlanosav Heavy Duty comes through on a good production-boosting job as it has in thousands of other plants."

* **PAXLANOSAV** *a plus blend of emollients including lanolin*

DR. PAX

℞ I prescribe Paxlanosav Heavy Duty for these reasons:

Paxlanosav Blended Emollient formulated of lanolin and other beneficial oils

Sterilized, specially processed vegetable scrubber

Plenty of rich, creamy lather that rinses quickly

No skin-punishing chemicals or free caustics

Low pH not exceeding that of ordinary drinking water

Maximum safe, thorough, fast cleansing

Resists chapping, dryness and other irritation

ADVERTISED IN AMERICAN MEDICAL ASSOCIATION PUBLICATIONS

PAXLANOSAV* HEAVY DUTY GRANULATED SKIN CLEANSER

For ALL General Skin Cleansing Needs

Paxlanosav Heavy Duty is a natural skin color to prevent substitution of inferior cleansers and to safeguard against the accidental use of harmful products intended for other purposes. *Its Natural Skin Color Protects Against Substitutes.*

G. H. PACKWOOD MANUFACTURING CO. 1545-55 Tower Grove Avenue St. Louis 10, Missouri

For Unusual and Special Skin Cleansing Tasks

PAX SULPHONATED OIL SKIN CLEANSER

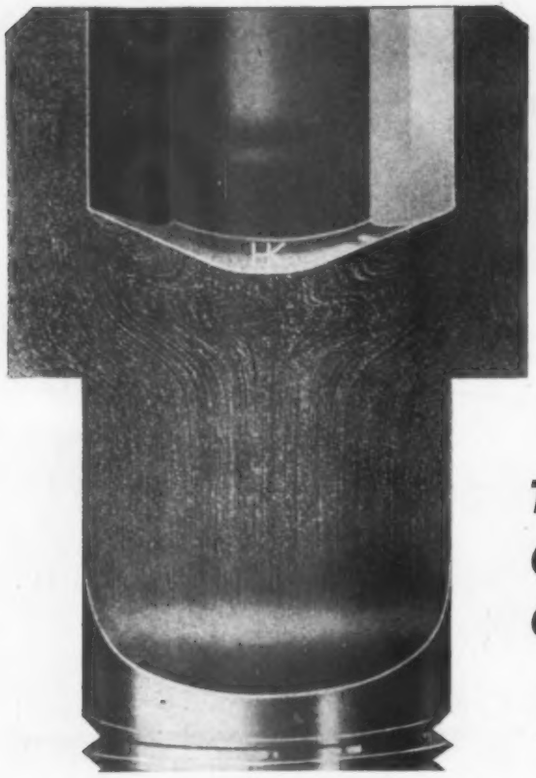
ADVERTISED IN AMERICAN MEDICAL ASSOCIATION PUBLICATIONS

Contains Lanolin

In occupations in which workers' hands come in contact with severe skin-defatting solvents, degreasing compounds, highly alkaline or other skin-irritating chemicals, Pax Sulphonated Oil Skin Cleanser can be used to supplement General Purpose Pax Heavy Duty Granulated Skin Cleanser. Of highest dermatological quality, non-alkaline, mildly acid, bland, soothing, non-sudsing, Pax Sulphonated Oil Skin Cleanser offers worker protection unexcelled by any other product of its type.

PAX

When you purchase any Pax Product you also purchase the experience and ability of Pax Technicians acquired through 30 years of exhaustive research and development.



Unretouched photo-etched cutaway—Holo-Krome FIBRO FORGED Socket Head Cap Screw.

***Notice these* CONTINUOUS FIBRES . . .**

The results of COMPLETELY Cold Forging

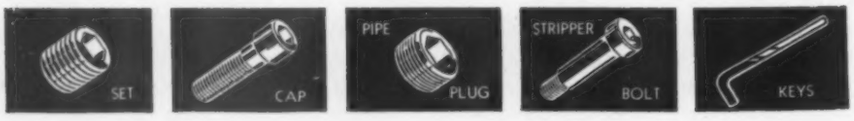
Patented Method Owned Controlled Exclusively used by Holo-Krome

HOLO-KROME *fibro forged* SOCKET SCREWS

Continuous Fibres running from end to end! Uninterrupted, unbroken, unsevered! A stronger Socket Screw. This continuous fibrous structure is obtained by Completely Cold Forging—a Holo-Krome patented method.

Yes, when you specify "Holo-Krome FIBRO FORGED Screws", greater strength, uniform quality and accuracy are assured plus the saving of weight, space and assembly time in your production.

THE HOLO-KROME SCREW CORP. • HARTFORD 10, CONN., U. S. A.



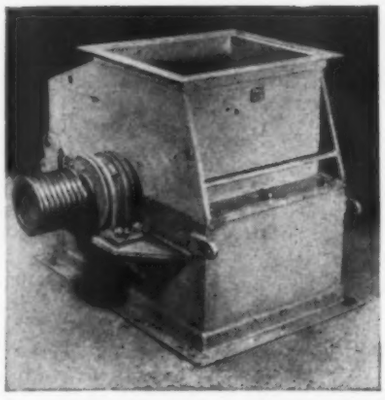
TUBE-TYPE DIAMOND DRILLS

COMPLETE line of Habib tube-type diamond drills, for drilling or trepanning abrasive or brittle materials such as glass, quartz, ceramics, sapphire, granite, and grinding wheel abrasives, is announced by the Wickman Corp., 15533 Woodrow Wilson Ave., Detroit 3, Mich. Drills are said to have diamond particles evenly distributed throughout entire wall section. Wall thickness is less than .024". Diamond section is ¾" in length. Available in sizes from 3/32" to 3" diameter, for use in any standard drill press with speed range from 1000-4000 rpm.

LARGE SIZE SOLDERLESS LUG

NEW large size Scrulug, known as the KPA34, is announced by Burndy Engineering Co., Inc., 107 Bruckner Blvd., New York 54, N. Y. It accommodates a range of wire and cable sizes from No. 4/0 wire to 500 Mcm cable. It is quickly installed by simply tightening the clamping bolt which forces a pressure bar on the cable. It is formed of brazed pure-copper for added mechanical strength. Its conductivity, pullout value and performance are said to greatly exceed the Underwriters' Laboratories requirements.

HEAVY DUTY HAMMER MILL



NEW model, W-30 (H), heavy-duty hammer mill for grinding, pulverizing, crushing, shredding, defiberizing, etc., is announced by Buffalo Hammer Mill Corp., Buffalo, 3, N. Y. Materials are broken up by blows from several batteries of revolving hardened-steel hammers at 1000 to 7500 rpm. This action is said to eliminate the generating of heat by the friction of rubbing and crushing actions, requiring less power and reducing wear and breakdowns to a minimum. Built-in trap which extracts foreign substances alleviates damage to the mill. Mills are available from ½ to 200 hp and speeds of 1000 to 7500 rpm capacities.

(*Please turn to Page* 182)

Coming in on the moon beam

"Inter-planetary travel is within the realm of possibility in the next 20 years," says a noted scientist. The ship "will make the trip in three and a half hours," writes one of the world's foremost aviation authorities. Atomic energy may be used. And storage batteries will have many jobs to do.

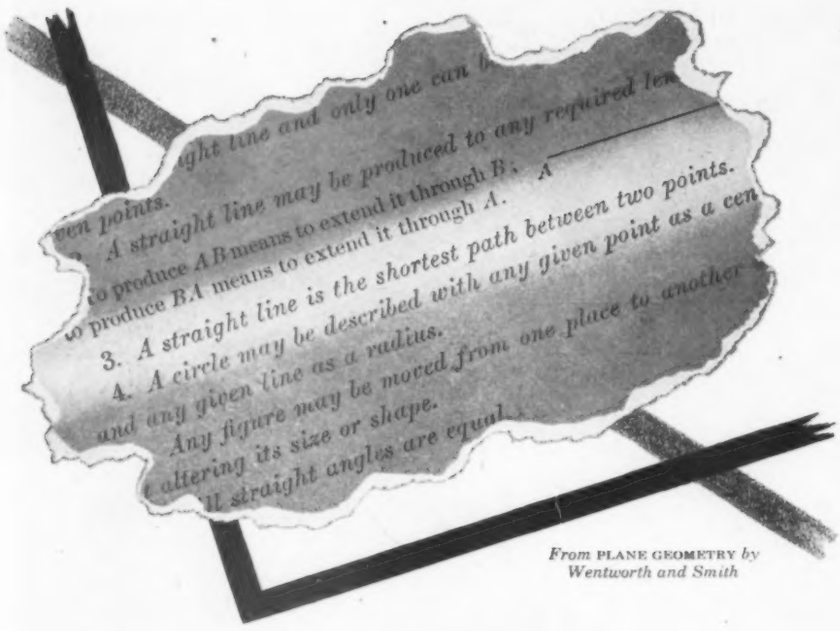
Exide has pioneered in the development of aircraft batteries since 1913. When the Luna Liners are ready, specially designed Exides will be ready too, just as they were ready for the jet-propelled "Shooting Star." Today, on most airliners and on thousands of government and personal planes Exides supply storage battery power.

Whatever the storage battery need, there is an Exide of the right size, capacity and construction. They're widely used to furnish safe, dependable power for electric industrial trucks and mine haulage units . . . for telephone, telegraph, railroad and radio station equipment . . . for aircraft, diesel engines, emergency lighting, and numerous other uses. And on millions of cars, trucks and buses, they continue to prove every day that "When it's an Exide, you start."

For 58 years the name Exide has stood for dependability, economy, safety and long-life. Information regarding the application of storage batteries for any business is available upon request.

Exide
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto


ght line and only one can b
ven points.
A straight line may be produced to any required len
o produce AB means to extend it through B; A
o produce BA means to extend it through A.
3. A straight line is the shortest path between two points.
4. A circle may be described with any given point as a cen
and any given line as a radius.
Any figure may be moved from one place to another
altering its size or shape.
ll straight angles are equal.

From PLANE GEOMETRY *by Wentworth and Smith*

We Say "Get in Touch With Our Distributor"

WE'VE EXPLODED THAT "STRAIGHT LINE" THEORY

. . . It may be good geometry, but the "straight line" theory isn't good distribution.

Take an example. You want a 50-foot length of ⅜-inch steel chain. We make it in our York plant. A "straight line" would be from us to you. Just like that.

But if you had to go direct to manufacturers for all the thousand and one things you have to buy, you wouldn't have time to do anything else.

That's where our distributor comes in. He is doing his best to keep a full assortment of all the chains we make—in all the sizes you need. We're doing our best to keep him supplied. So that you can pick up your phone and get what you want—when you want it.

So the "shortest path" between our chain mill and your plant is by way of an American Chain distributor. His business is to serve you with products and up-to-the-minute technical information about them. He is responsible to you just as we are responsible to him for the quality of the products we make for your use.

We offer you the best chain and chain fittings we know how to make. And, so that it will be easier for you to buy, we say . . . "Get in touch with our distributor."

ACCO

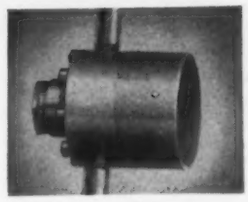
York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

SMALL PRESSURE REGULATOR



SMALL and compact regulator known as the Mity-Mite, weighing less than 2 pounds and measuring 2¾" x 3¼", suitable for handling initial pressures up to 3500 lbs. with adjustable control range from 5 lbs. to 1500 lbs., is announced by Grove Regulator Co., 6599 65th St., Oakland, Calif. Maker states capacity range is equal to that of regulators ten times its size. Although primarily designed for air and gases, including hydrogen, nitrogen, oxygen, etc., unit can also be furnished for liquid services. It is available for ⅛" and ¼" pipe sizes. Bulletin 940 gives full details.

FIVE NEW PORTABLE COMPRESSORS ANNOUNCED

FIVE new compressors of 60, 105, 160, 210, 315 c.f.m. capacity are announced by Davey Compressor Co., Kent, Ohio. All units are of V-type cylinder design, except the Model 315 which is of "W" construction with four low-pressure and two high-pressure cylinders. Aluminum alloy compressor heads, providing cooler compressor operation and permanent freedom from valve carbonization, and aluminum crankcases providing substantial weight savings, are utilized in all models. New models are available in industrial departmental, skid, steel wheel, pneumatic tired trailer, and flanged wheel units for mine and railway work.

ALUMINUM ALLOY WHEEL

ALUMINUM alloy wheel with pneumatic, cushion, or moulded-on-rubber tires, is announced by Hutton Wheel Corp., 2110 Walnut St., St. Louis, 3, Mo. These light-weight aluminum alloy wheels are said not to be subject to corrosion or rust and are made in sizes from 4" to 16" in diameter. Wheelbarrow sizes are also made with either pneumatic or zero pressure rubber tire.

(*Please turn to Page* 186)

Buy The Bearings Your Engineers Prefer-

TIMKEN

Tapered Roller Bearings

Timken Roller Bearings are old tried and trusted friends to thousands of designing engineers in many industries. They have earned this confidence through a combination of scientific design; precision manufacture; and Timken Alloy Steel, plus more than 48 years of continuous engineering development and experience.

Timken Bearings are the universal choice for equipment of all kinds — wherever wheels and shafts turn — because they assure the performance and endurance machine manufacturers and users must have.

Every genuine Timken Bearing is positively identified by the trade-mark "TIMKEN" stamped on cup and cone. Look for it on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

The most important advance in motor design in 58 YEARS...

When Westinghouse engineers began designing a postwar motor they abandoned the concept that all motors must be cousins. Instead, they asked electric motor users *what they wanted* in motors . . . features they couldn't buy in any one motor.

These features demanded most by motor users are *all* incorporated in the new Life-Line Motors:

ALL-STEEL PROTECTION. All frames, feet and brackets are HEAVY STEEL. Life-Line Motor stators are far stronger—a new core locking device eliminates rivets.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

the New WESTINGHOUSE Life-Line MOTOR

It's completely new . . . it's completely different . . . it wraps up the advances made in "custom-built" wartime motors in a single package!

For 58 years, induction motors have been built fundamentally alike. Differences have been minor . . . improvements gradual. Today, in the new Life-Line, Westinghouse presents a major departure from accepted ideas of standard-motor limitations.

Life-Line, today, offers industry a truly all-steel protected motor. All exposed surfaces are HEAVY STEEL—frames of even the smallest sizes are 3/8" thick.

More compact power is packed in Life-Line. For example, on the 284 frame, size has been reduced 35%, although NEMA mounting dimensions have been maintained . . . starting torques are as much as 134% greater per pound of motor . . . maximum torques as much as 116% more per pound.

Electrical characteristics have been improved . . . new materials and new winding techniques give increased protection against electrical failure. And sealed, pre-lubricated bearings do away with need for greasing or attention for at least five years!

The Life-Line Motor, as a result, represents the biggest single step forward in design and construction since the invention of the electric motor 58 years ago. Life-Line Motors are now reaching the drives of industry by the thousands, but are not yet available in quantities to meet the unprecedented demand. So, look over Life-Line advantages now with an eye to your future requirements. Your local Westinghouse office can give you full details, or write to Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y.

★ ★ ★

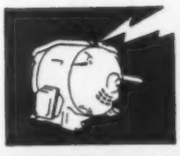
Life-Line Motors are now in production at the new Westinghouse Motor Works in Buffalo, N. Y. This plant is laid out, tooled and equipped to fully utilize newly developed production processes and techniques on a scale hitherto unequalled in the manufacture of electrical motors.

J-21406

LESS SPACE PER HP. Life-Line Motors occupy less space per horsepower than any other standard motor . . . making it easier to build into machines and install in cramped quarters.

MORE TORQUE PER LB. Life-Line Motors give as much as 134% higher starting torque per pound of motor . . . up to 116% higher maximum torque.

NO LUBRICATION FOR 5 YEARS. Life-Line Motors need no greasing for AT LEAST FIVE YEARS. Bearings are pre-lubricated . . . sealed against dirt and moisture.



IMPROVED WINDINGS. New insulating materials . . . new coil winding techniques . . . new stator slot designs . . . give the Life-Line new record-setting protection against electrical failures.

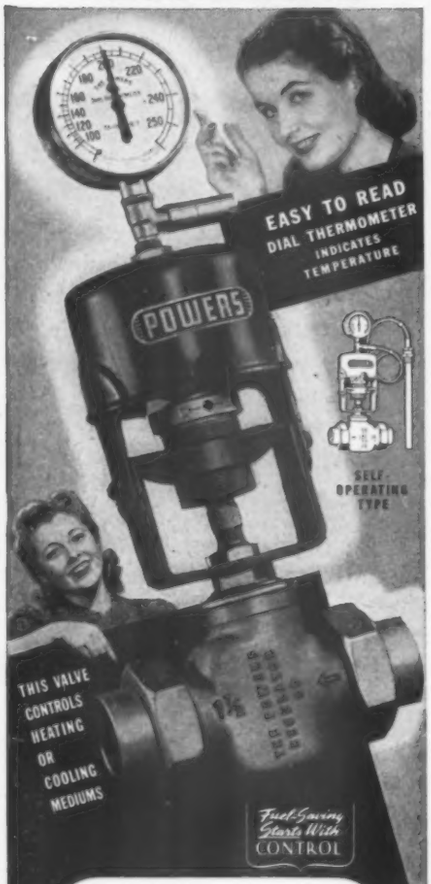
NEW QUIET SMOOTHNESS. Life-Line Motors cut vibration and noise to new low limits for standard motors . . . satisfy many "special motor" requirements.

NEW SLEEK LINES. The Life-Line has sleek lines . . . a smooth finish . . . discourages dust and dirt accumulations . . . harmonizes with modern machine and tool design.

Life-Line motors

Economize WITH POWERS

TEMPERATURE REGULATORS



Use a Powers No. 11 Temperature Indicating Regulator when you want the advantages of an easy-to-read dial thermometer combined with a dependable self-operating regulator. The dial thermometer gives a visual check on the performance of the regulator and makes it easy to adjust for the required operating temperature. Various dials and ranges are available.

Is Easy To Install—because both the thermometer and the regulator operate from the same thermal system—only one tapped opening is required.

Write for Circular 2511

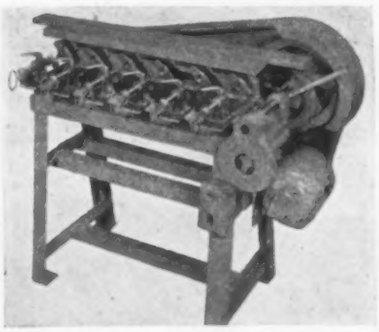
THE POWERS REGULATOR CO.

2792 Greenview Avenue, Chicago 14, Illinois
231 E. 46th St., New York 17, N. Y.—Offices In 47 Cities . . . See your phone directory.

70

OVER 50 YEARS
OF AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL

COCK GRINDING MACHINE



IMPROVED six-spindle Cock Grinding Machine, designed especially to grind and lap larger sizes and wider variety of tapered valve cocks, is announced by Milwaukee Cock Grinding Machine Co., 2357-Q North 29th Street., Milwaukee, Wisc. Machine handles all sizes from ⅛" to 1½" ips, including those for steam, air gases, liquids and railroad cutout and angle cocks. It is said to grind and lap up to 300 cocks per hour, depending on their size, and can grind up to six different types simultaneously. Model B, provided with two-jaw chucks, grinds valves with flats on the stems; Model C, equipped with heat-treated alloy steel collets, grips round valve stems. Collets available with grips up to 1" diameter.

METAL AND MAINTENANCE CLEANING COMPOUNDS

NEW series of metal and cleaning compounds, known as the Houghto-Clean 200 Series, embodying 17 different products including cleaners for maintenance work, ferrous and non-ferrous metals, for use prior to painting or vitreous enameling, electrolytic cleaners and special purpose compounds, is announced by E. F. Hougton & Co., 303 W. Lehigh Ave., Philadelphia, 33, Pa. Manufacturer states new compounds were developed to provide increased speed and greater efficiency so that alkaline cleaners can be used in the production line with considerable saving of time as compared to former practice. Circular available.

MYKROY FEED THROUGH INSULATOR

MYKROY feed through insulators, injection molded to precision tolerances which yield uniformly flat shoulders said to be free of high pressure spots and to eliminate cracking when nuts are tightened, are announced by Electronic Mechanics, Inc., 70 Clifton Blvd., Clifton, N. J. Mykroy is a glass-bonded mica ceramic said to be unequalled for many high-voltage and high frequency applications. Insulators are available in size range of ¼" to 5". Transformer bushings of molded Mykroy are also available.

(*Please turn to Page* 188)

What type of STAINLESS FASTENER do you need?

Prompt delivery from the largest stock in the nation!

Screws . . . nuts . . . washers . . . pins . . . Allmetal carries the largest stock in the country of stainless steel fasteners and screw machine parts. We also have facilities for heading, tapping, drilling, reaming, slotting, turning, stamping, broaching and centerless grinding . . . and we work not only with stainless and monel, but also with duralumin, aluminum, brass, bronze, or any other non-corrosive metal. All parts produced to close tolerances. Write for our catalog today. Allmetal Screw Products Co., Inc., 33 Greene St., New York.

Send for FREE CATALOG

This new, 83-page catalog helps you select the correct size and type of non-corrosive fastening device for any particular job. Includes stock sizes, specials that can be made, engineering data, etc. Make request on company letterhead.

Write to Department PG

ALLMETAL
SCREW PRODUCTS CO., INC.
33 Greene Street, New York 13

SPECIALISTS in STAINLESS FASTENERS

STEP UP — SHEET METAL SHEARING SAVE MONEY, MUSCLE, MANPOWER

*Trade Mark Reg. U. S. Pat. Off.

BLACK & DECKER Electric PORTO-SHEARS combine powerful shearing action with surprisingly rapid speed. They cut sheet metal too tough for snips. Speed up jobs where snips are slow. Feed easily with only a light forward pressure.

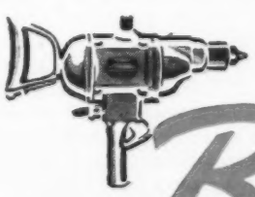
CUTTING OPERATION ALWAYS VISIBLE

You can watch PORTO-SHEARS cut through the work. That's why it's easier to follow straight lines, irregular patterns, curves down to 3/4" radius, without fear of rejects. There are no burrs or ragged edges, either, because PORTO-SHEARS make cleaner, smoother, more accurate cuts.

CUT MANY MATERIALS

Black & Decker 16-Gage PORTO-SHEARS cut up to rated capacity in steel or galvanized iron—about one gage thinner in Monel or stainless—50% above rating in copper, aluminum, lead and other non-ferrous metals. Can be adapted to cut thin sections of laminated wood or sheet plastics.

SEE YOUR BLACK & DECKER DISTRIBUTOR. He'll be glad to give you full information on time-saving PORTO-SHEARS—or help you with any other tooling problem. For your free copy of our complete catalog, write to: The Black & Decker Mfg. Co., 664 Pennsylvania Ave., Towson 4, Md.



LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

another job
DONE RIGHT

with an ARMOUR Alundum Cloth Belt

Export: Durex,
63 Wall Street,
New York 5, N. Y

WHATEVER YOUR PRODUCTS OR SPECIALIZED NEEDS . . .
one of Armour's complete line of better metal-working abrasives is *right for you!*

ARMOUR
Sandpaper
WORKS

Division of Armour and Company

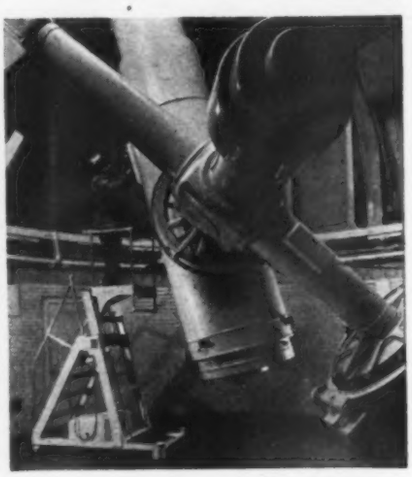
1355 West 31st Street • Chicago 9, Illinois

LIFT-PLATFORM UNIT HAS INDUSTRIAL APPLICATIONS

A new type of electrically operated observation platform unit designed for safety and convenience of those who work at various heights above floor levels has been built by the Elwell-Parker Electric Co., Cleveland.

It is unique in that it has two platforms, one stationary at a height of 5 feet, the other adapted to be raised or lowered automatically within a range of 8 feet above floor, providing for observation at 13 feet and adjustments at 15 feet.

Built mainly of aluminum alloy and mounted on ball-bearing, rubber-tired wheels, it is easily moved by one man in places where material or equipment and



Dr. J. J. Nassau, director of observatory, works on 24-36-inch telescope from new lift platform

worker must be elevated and where security is essential.

Base of the truck is 3 x 6 feet. Electric motor, reduction gear and winding drum for hoist cables are enclosed and mounted compactly on this base. Current for the motor is supplied through flexible line from the building circuit.

Capacity of the elevating platform is 500 pounds. Its movement may be started or stopped at any height by means of a small toggle switch or push button on the platform's guard rail. Also, its motion automatically stops when it reaches either bottom or top level.

The new unit was installed recently in the Warner & Swasey Observatory of Case School of Applied Science, East Cleveland, O.

AUTOMATIC POWER CLAMPING

The National Automatic Tool Company, Inc., Richmond 37, Ind., announces the Natco Automatic Clamping for fixtures in connection with automatic processing machines for drilling and tapping. The clamping is arranged for either hydraulic or electric operations and completely eliminates wrenches. Twelve-page book entitled "Natco Automatic Clamping shows and describes actual production views of the fixture.

(*Please turn to Page* 192)

It's here at last—a new, better way to combine the tonnage output you get from maximum open area with the long-life economy of heavier wire diameters.

In *Roe-Flat,* Roebling introduces a crimping method that provides an *absolutely flat* wearing surface. Without reducing open area, without sacrificing volume of production, *Roe-Flat* gives you up to 90% longer wire screen life!

Here's why:

1. *Roe-Flat* has over 75% more metallic wearing surface than ordinary crimps—because wear is spread evenly over practically all the surface of the wires, not concentrated on the raised intersections.

2. With parallel wires on the same plane, there's less blinding because of *Roe-Flat's* unique construction.

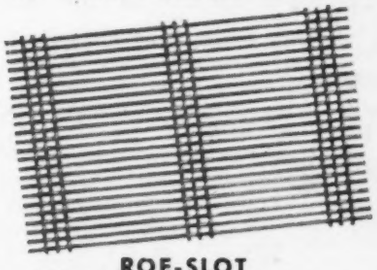
3. Accurate size of openings assures uniform product, helps increase screening production.

4. Improved quality steel is used, to increase *Roe-Flat's* resistance to abrasion, wear and fatigue.

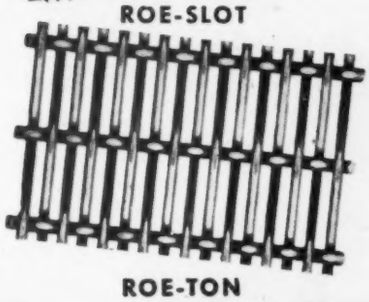
The advantages of *Roe-Flat* crimp can be incorporated in wire screening of practically every design. Get the full story. Write today for the facts.

JOHN A. ROEBLING'S SONS COMPANY
Woven Wire Fabrics Division
TRENTON 2, NEW JERSEY

TWO OTHER WAYS TO CUT SCREEN COSTS



ROE-SLOT



ROE-TON

ROEBLING

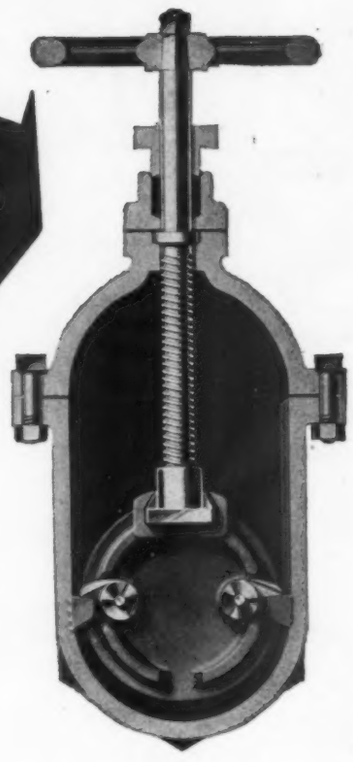
A CENTURY OF CONFIDENCE

Manufacturers of Wire Rope and Strand • Fittings • Slings • Suspension Bridges and Cables • Aircord, Aircord Terminals and Air Controls • Aerial Wire Rope Systems • Electrical Wire and Cable • Ski Lifts • Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Screen, Hardware and Industrial Wire Cloth • Lawn Mowers

Every feature you want in an

IRON BODY DOUBLE-DISC GATE VALVE

is in this KENNEDY DESIGN



It will pay you to study the operating mechanism of this Kennedy Standard Iron Body Double-Disc Gate Valve.

First notice its simplicity . . . it consists only of two discs, two cams and a stem nut.

When the valve is closing, the cams do not operate until the port opening is completely closed. The lugs on the body then engage with the arms on the cams, causing them to revolve, and forcing the two discs tight against the seats *at the exact moment of closure.*

When opening the valve, the first movement of the stem disengages the arms of the cams from the lugs in the body, immediately releasing the discs.

Then note these additional important advantages . . . location of actuating lugs well above the bottom of the valve to prevent sediment from interfering with correct operation . . . perfect operation with either disc toward the pressure, and with valve in any position . . . interchangeability of both discs and cams, so that mechanism cannot be assembled incorrectly.

This design, together with the many other Kennedy Valve types for all standard requirements, is fully described in the 240-page Kennedy Catalog which will be sent on request.

Buy From Our Distributor

YOU WANT THESE VALVE FEATURES

. . . you'll find them in this KENNEDY design

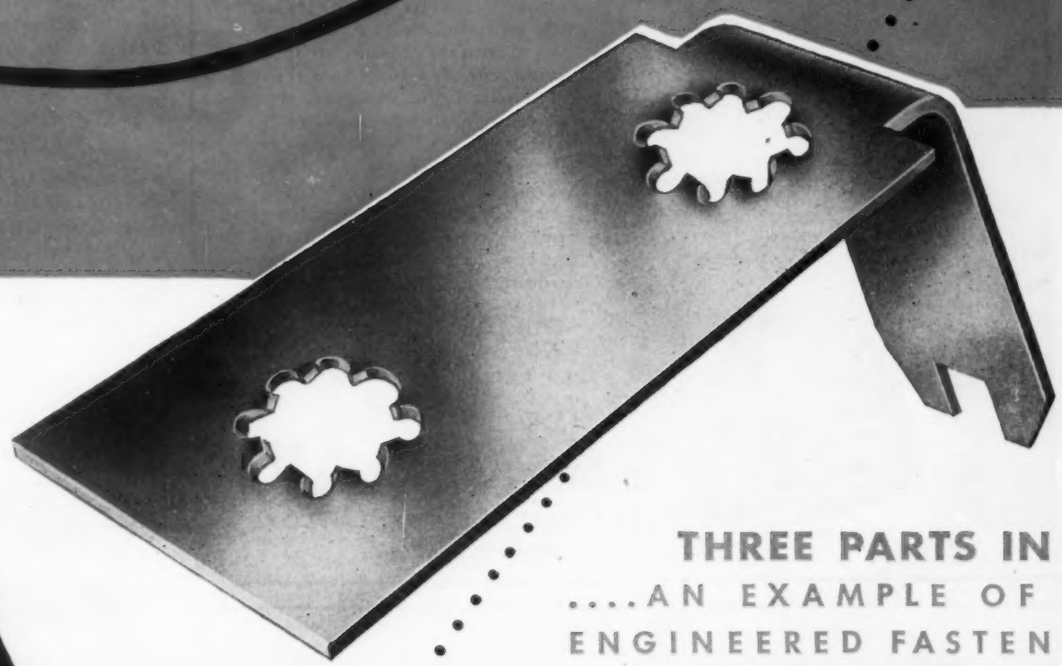
1. **Generous Strength . . .** Body and bonnet are of high-grade dense metal with ample thickness and rounded fillets. Stem has large diameter and extra large number of contact threads.
2. **Easy Operation . . .** Stem and stem contact surfaces are accurately threaded. Deep stuffing boxes permit tightness without undue pressure on packing. Large handwheel gives firm, comfortable grip.
3. **Lasting Tightness . . .** Discs and seats seat accurately, and their sturdy design resists distortion and has special provisions for take-up of wear.
4. **Long Life . . .** Many Kennedy valves have been in daily use a quarter century and more.
5. **Convenient Repacking . . .** Glands and packing are easily accessible.
6. **Economical Maintenance . . .** Long wear built into all parts, and adjustments or other attention are seldom required.

THE KENNEDY VALVE MFG. CO.
Elmira, New York

KV-135

KENNEDY *valves - pipe fittings - fire hydrants*

Here's a SHAKEPROOF Cost-Saver!



THREE PARTS IN ONE

....AN EXAMPLE OF HOW ENGINEERED FASTENINGS REDUCE COSTS!

Cost is a lot of little things. Here is one small part of an assembly that originally called for installation with two lock washers under screws. With production calling for thousands of these parts monthly, unit assembly time is important. In addition, the essential lock washer *might* be omitted by a hurried worker. But by calling Shakeproof Inc., the manufacturer obtained an *engineered part* which incorporated the locking feature so necessary . . . eliminated the use of separate lock washers . . . reduced his material cost . . . lowered assembly charges . . . increased the speed of attachment . . . and became absolutely sure of quality control.

If you are planning to use small stamped parts that must be locked tight, where high production and speed of assembly are important factors, it will pay you to investigate the advantages of Shakeproof Engineered Fastenings. Do it today.

SHAKEPROOF INC.

Fastening Headquarters

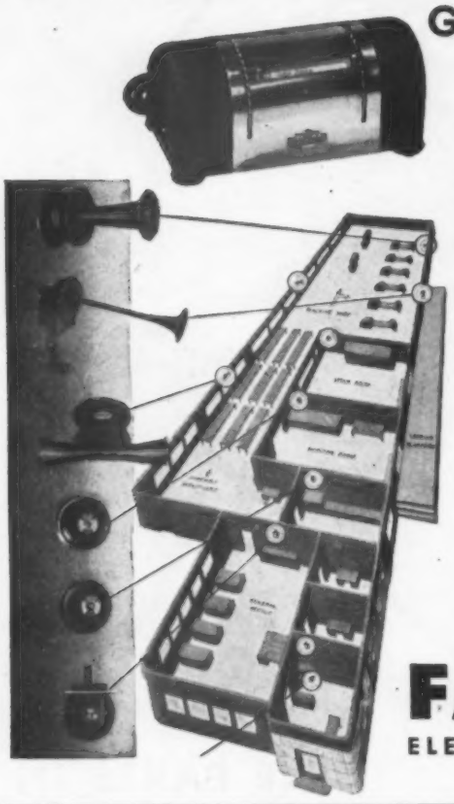
Division of ILLINOIS TOOL WORKS

2501 North Keeler Avenue, Chicago 39, Illinois

633 South Lakeview Ave., Los Angeles 26, Cal. 2895 E. Grand Blvd., Detroit 2, Mich.

FARADAY KODEMASTER

Gets the right man in a jiffy!



Every factory large enough for a telephone switchboard needs the efficient Faraday Kodemaster. It's the ideal system for locating individuals in a hurry—up to 30 different code signals.

Kodemaster is a unique, compact, fool-proof control for *old* or *new* signal systems. May be set up with any number or combination of bells, buzzers, horns, Kodaires, chimes, sirens.

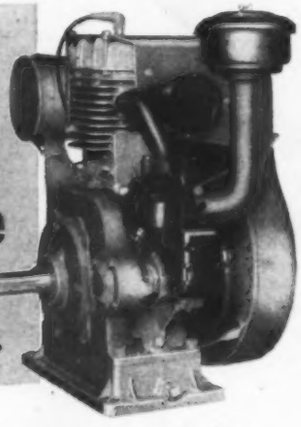
For time-saving signaling, and low installation and maintenance cost, install Faraday Kodemaster. Can be installed by any competent electrician.

FARADAY UNIPACT units are interchangeable, "as easy as plugging in a toaster."

At your electrical distributor's

FARADAY
ELECTRIC CORPORATION
Adrian, Michigan

This HEAVY-DUTY
WISCONSIN
Air-Cooled Engine
IS AVAILABLE IN 4
SIZES . . . 4 TO 9 H. P.



Illustrated above is the Models AEH to AHH series of 4-cycle single cylinder Wisconsin Air-Cooled Standard Engines, to which the following specifications apply:

MODEL	AEH	AFH	AGH	AHH
Bore	3"	3¼"	3½"	3⅝"
Stroke	3¼"	4"	4"	4"
Cu. in. Displ.	23	38.2	38.5	41.3
Hp. Range	4-6	5-7	6-8.5	7-9
Weight	130 lbs.	170 lbs.	175 lbs.	180 lbs.

If your equipment calls for an engine within the above power range, it will pay you to give serious consideration to the Wisconsin line . . . noted for rugged, heavy-duty serviceability and thorough-going dependability.

In addition to the engines listed above Wisconsin 4-cycle single cylinder engines are also available in 2 to 4 hp. sizes, and V-type 4-cylinder engines can be supplied in a power range of 13 to 30 hp. Detailed data furnished on request.

WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN
World's Largest Builders of Heavy Duty Air-Cooled Engines

DOUBLE PURPOSE DIES

Dies designed to serve a double purpose in steel metal fabricating and stamping of aluminum, magnesium, stainless steel and many other metals is an interesting phase of the Engineered Service offered by Colgate Mfg. Corp., Amityville, N. Y. The dies are designed so that they may be used for a second-choice material during the interim period that a manufacturer is confronted with a shortage of the metal he normally uses, and later converted at reasonable cost to the customary metal, thus enabling a manufacturer to continue production which otherwise would halt.

LARGE ELECTRIC HEATING PAD OF CONDUCTIVE RUBBER

Conductive rubber, improved during the war for military use, has been applied to a gigantic electric heating pad built by the Goodyear Tire and Rubber Co., Akron, Ohio, to serve as an ink-drying medium in the fabric printing industry.

Weighing 187 pounds, 30 feet long and 65 inches wide, the pad was developed

The pad is 30 feet long, and weighs 187 pounds.

to function as a table-top drying element so that multiple colors may be inked on textiles in one continuous operation. Waterproof and highly flexible, the pad is fashioned "sandwich" style of specially compounded electricity conducting rubber between non-conductive sheets. Heat output is eight kilowatts, controlled by a thermostat and accomplished without the use of resistant wires or metallic elements. The heat volume can be maintained automatically from room temperature to 170 degrees.

HYCAR AMERICAN RUBBER NEW NAME OF GOODICH PRODUCT

Hycar American Rubber will henceforth designate the acrilonitrile type rubber produced by chemical synthesis by the B. F. Goodrich Chemical Co., Rose Building, Cleveland, Ohio, according to announcement by president W. S. Richardson. It is felt that the word "synthetic" carries the implication that rubber so named is inferior to natural rubber, and the change, Mr. Richardson said, is in accordance with trend in the rubber and chemical industries to end usage of the word synthetic in reference to man-made materials which are in no way "imitations or substitutes" and for many purposes are superior to natural products.

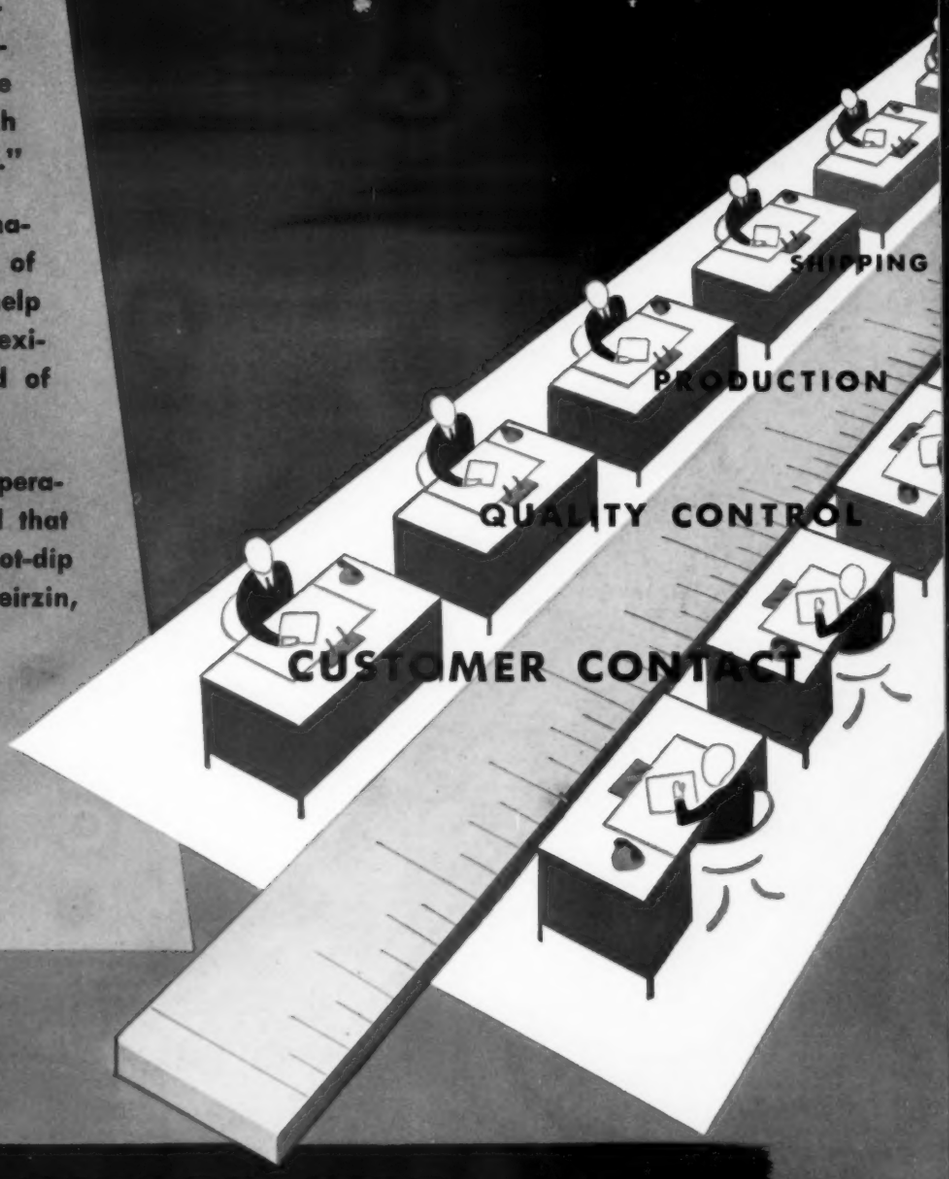
(*Please turn to Page* 196)

How far to the answer?

ONLY A MATTER OF FEET separates the Weirton specialists who bring their diverse talents to bear upon your steel problems. Metallurgists, production men, salesmen, shipping supervisors are all gathered within easy reach of one another "under one roof."

This centralization and coordination characterize all phases of Weirton's operations. And help to account for the unusual flexibility, versatility and speed of Weirton service.

The benefits of integrated operation extend to every steel that Weirton makes: Weirite hot-dip and electrolytic tin plate, Weirzin, Weircoloy, Weiralead, hot and cold rolled strip, cold rolled spring steel, cold rolled sheets, manufacturing and long ternes, structurals, N-A-X High-Tensile.



WEIRTON STEEL COMPANY

WEIRTON STEEL CO.

WEIRTON, W. VA. *Sales Offices in Principal Cities*

Division of **NATIONAL STEEL CORPORATION**

Executive Offices, Pittsburgh, Pa.

NATIONAL STEEL

RELIABILITY

The SUPERSTRONG box or crate you buy today represents the experience and expert craftsmanship gained in nearly a century of better box making.

Many large users of shipping containers are planning with us for their long range requirements. Our engineering department will be glad to tell you how SUPERSTRONGS—"Bound with Steel"—can solve the shipping problems of your future postwar products.

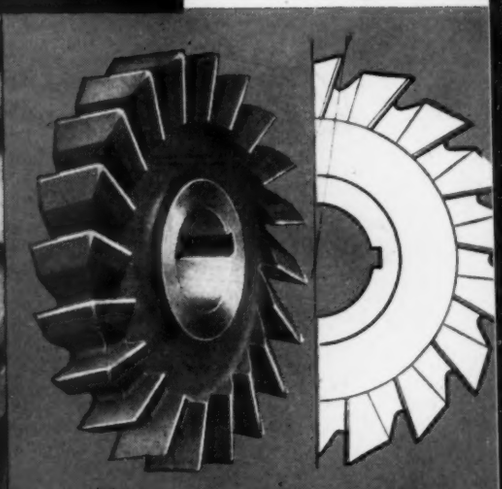
SHIPPING TRADE SUPERSTRONG MARK CONTAINERS REG. U.S. PAT. OFF.

RATHBORNE, HAIR AND RIDGWAY COMPANY

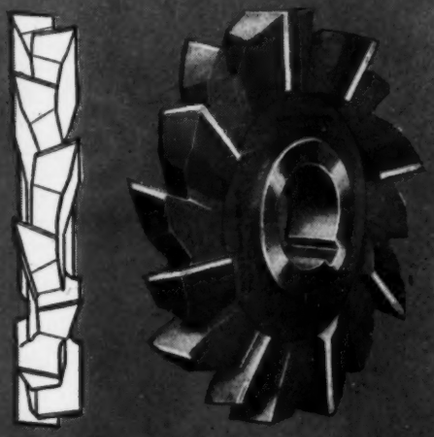
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

5½ square inches* of steel removed at one pass of these cutters

... THAT'S CUTTING CUTTER COST



Half Side Milling Cutters . . . used in straddle milling or cutting slots where complete bottom finish is not needed.



Staggered Tooth Side Milling Cutters . . . The alternate spiral angles of the teeth and the angle of undercut enable these cutters to remove large amounts of metal without destructive vibration or chatter. Deep cuts are made with good finish. Also used in making shallow cuts where depths must be varied.

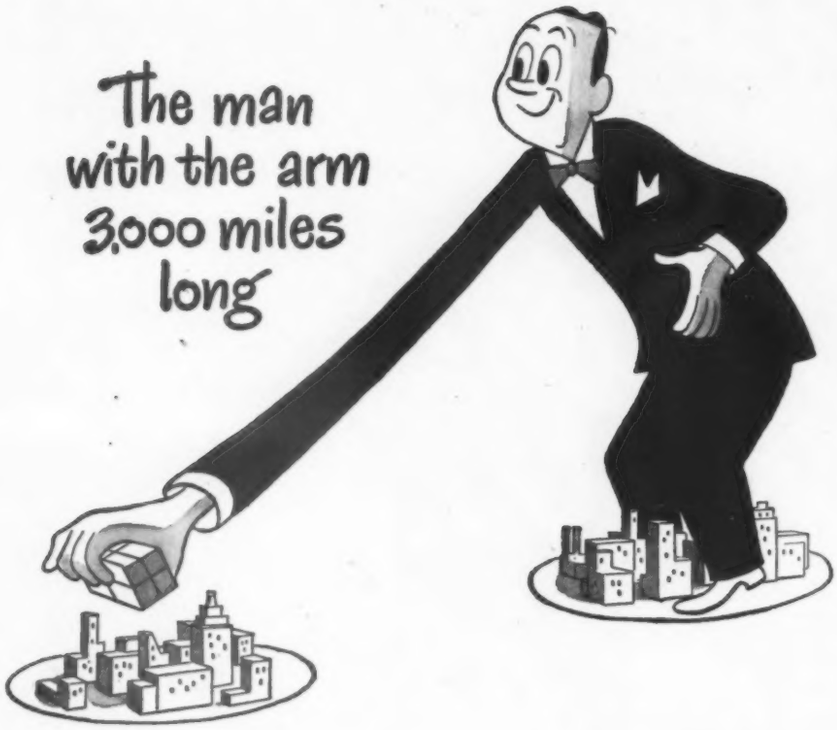
*Cross-section area of metal removed.

In the job above, nine slots 5/16″ wide and two end cuts 9/32″ wide . . . all 1-11/16″ deep . . . are being milled simultaneously by a gang of nine Staggered Tooth and two Half Side Milling Cutters. That's removing 5½ square inches (in cross-section area) of low carbon steel at a single pass. These Brown & Sharpe cutters are completing ten pieces per hour.

There's a *good* reason for preferring Brown & Sharpe milling cutters. They cut more metal per sharpening and cut it faster . . . all of which gives the lowest *real* cutter cost. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

B·S *We urge buying through the Distributor*

BROWN & SHARPE CUTTERS



In his business — just like yours these days — he is always running out of supplies and parts he needs in a hurry. Yet customers have to be satisfied.

Well, he doesn't have a nervous breakdown. He doesn't lose customers. Instead, he gets *what* he needs *when* he needs it by specifying Air Express delivery.

"Air Express," he said, "is like reaching out to any supplier's warehouse *wherever* it is — and picking up just what's wanted. Air Express puts the most distant suppliers *right next door.*"

Specify Air Express - it's Good Business

- Low rates. • Special pick-up and delivery at no extra cost.
- Direct by air to and from principal U. S. towns and cities.
- Air-rail to 23,000 off-airline communities.
- Direct air service to and from scores of foreign countries.

Just phone your local Air Express Division, Railway Express Agency, for fast shipping action . . . Write today for Air Express Rate Schedules containing helpful shipping aids. Address Air Express, 230 Park Avenue, New York 17, N. Y. Or ask for them at any Airline or Railway Express Office. Air Express Division, Railway Express Agency, representing the Airlines of the United States.

AIR EXPRESS

AIR EXPRESS

GETS THERE FIRST

Rates are low

To Air Express a 5 lb. package 1349 miles costs only $2.32! Heavier weights similarly inexpensive. Investigate!

SMOKE CONTROL FOR INDUSTRIAL PLANTS

Mr. P. S. Dickey, chief engineer, Bailey Meter Co., Cleveland, Ohio, in a recent paper presented before the American Society of Mechanical Engineers, threw some interesting sidelights on the problem of smoke control. He stated that with an efficient system of boiler control, coordinated to maintain fuel feed, air flow and furnace draft at the correct values, it is possible to operate properly designed furnaces with little, if any, smoke. One of the main functions of control is to keep the smoke and fly ash at a minimum.

Mr. Dickey also stated that firemen can contribute immensely to the problem of smoke control. A well trained fireman can operate a furnace in such manner that no smoke will appear even though automatic control is not in use. However, this is not recommended as there is a tendency to use an excessive amount of air, thereby not obtaining the maximum heat recovery from the fuel.

5,100-POUND ROLLER BEARING

Accompanying illustration shows the largest spherical roller bearing ever built in the United States being machined at SKF Industries, Inc., Philadelphia, Pa. Two such bearings, each four feet in

Bearings are 4 ft. in diameter

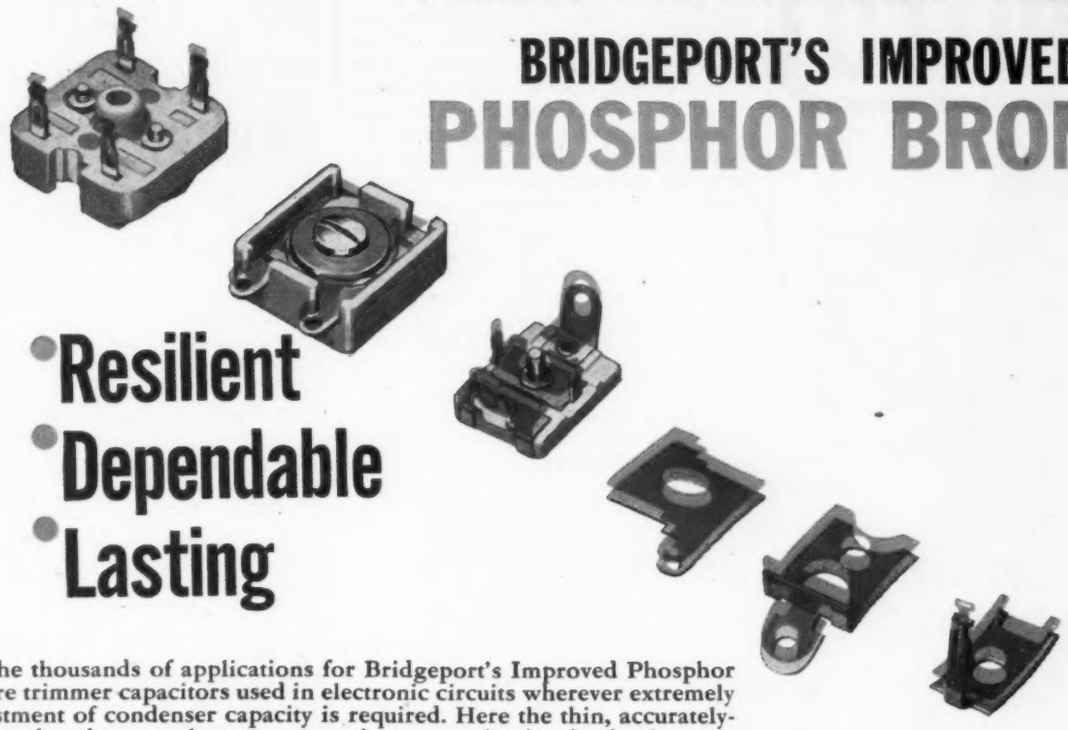
diameter, weighing 5,100 pounds and designed for a basic load in excess of 4,000,000 pounds, are destined for what is said to be the world's biggest supercalender now under construction at the Beloit Iron Works, Beloit, Wis., for the Niagara, Wis., paper mill of the Kimberly-Clark Corp.

NEW EDITION OF SPRING HANDBOOK AVAILABLE

Accurate Spring Manufacturing Co., 3825 W. Lake St., Chicago 24, Ill., announces the publication of the third edition of its Handbook of Technical Data on Springs. This 36-page handbook offers clear, concise data on such subjects as design formulation, load deflection, and the proper methods of specifying springs. Several helpful short cuts for making spring calculations are also presented. Copy may be had for the asking.

(*Please turn to Page* 198)

PRODUCT IMPROVEMENT THROUGH BRIDGEPORT'S IMPROVED PHOSPHOR BRONZE



- Resilient
- Dependable
- Lasting

Among the thousands of applications for Bridgeport's Improved Phosphor Bronze are trimmer capacitors used in electronic circuits wherever extremely fine adjustment of condenser capacity is required. Here the thin, accurately-made phosphor bronze plates must continue to maintain absolutely exact spring pressure at all times.

The functioning of electrical instruments and equipment generally depends upon the special spring properties of small but vital metal parts. Although the metal cost of such parts is relatively insignificant compared to the cost of the complete mechanism, failure of the part may jeopardize the entire installation.

The limited service life of many well-designed products is generally due to premature failure of small but vital parts. If these were made from more suitable alloys, increased service life and dependability would follow. Product engineers and designers are carefully scrutinizing and revising their metal specifications to make sure that modern copper-base engineering alloys are not overlooked.

Whether you make capacitors, switches, relays, radio or electronic devices, or other types of electrical equipment or appliances, we suggest that you investigate the possibility of improving your products with Bridgeport's Improved Phosphor Bronze and Duronze Silicon Bronzes and Aluminum Bronzes. Our Technical Service Department is ready to assist you in the selection and application of Bridgeport's modern engineering alloys to your particular needs.

Trimmer Capacitors, courtesy The Electro Motive Manufacturing Company, Willimantic, Conn.

BRASS • COPPER
BRONZE • DURONZE
CUPRO NICKEL
NICKEL SILVER
Rod
Strip
Wire
Tubing

"Bridgeport" BRASS

BRIDGEPORT BRASS COMPANY

Established 1865 • BRIDGEPORT 2, CONNECTICUT

Warehouse and Jobber Stocks Available for Prompt Delivery

BRANCH OFFICES AND ★WAREHOUSES

Atlanta 3, Georgia...701 Volunteer Building
Boston 16, Massachusetts...524 Statler Bldg.
★ Chicago 32, Illinois.....3453 W. 47th Place
Cincinnati 2, Ohio.....1703 Carew Tower
★ Cleveland 6, Ohio .....1921 E. 119th Street
★ Denver 2, Colorado .....1962 Blake Street
Detroit 26, Michigan.....2328 Buhl Bldg.
Grand Rapids 2, Mich..200 N Division Street
★ Houston 1, Texas.....2216 Walker Avenue
Indianapolis 4, Indiana..Circle Tower Bldg.
★ Los Angeles 12, California, 130 S. Hewitt St.
Milwaukee 2, Wisconsin, 715 N. Van Buren St.
★ Minneapolis 1, Minnesota, 100 N. Second St.
★ Newark 8, New Jersey ....325 Jelliff Avenue
New York 17, New York..420 Lexington Ave.
New York—Jobber Stocks Available
Philadelphia 3, Penn....Broad St. Sta. Bldg.
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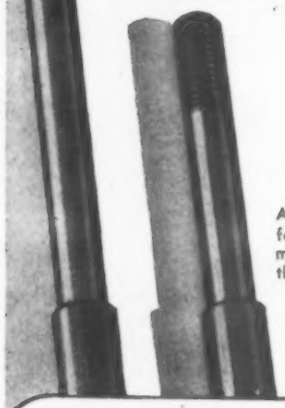
★ St. Louis 3, Missouri.....2135 Delmar Blvd.
St. Paul, Minnesota.....703 Ashland Avenue
★ San Francisco 3, California...1155 Bryant St.
Washington 5, D. C..715 Southern Building

Brass-Bronze-Copper-Duronze

STRIP ROD WIRE TUBING

BRIDGEPORT BRASS

RITCO



Adjusting screws for woodworking machinery. Acme thread, ¾" dia.

ADJUSTING SCREWS and STUDS

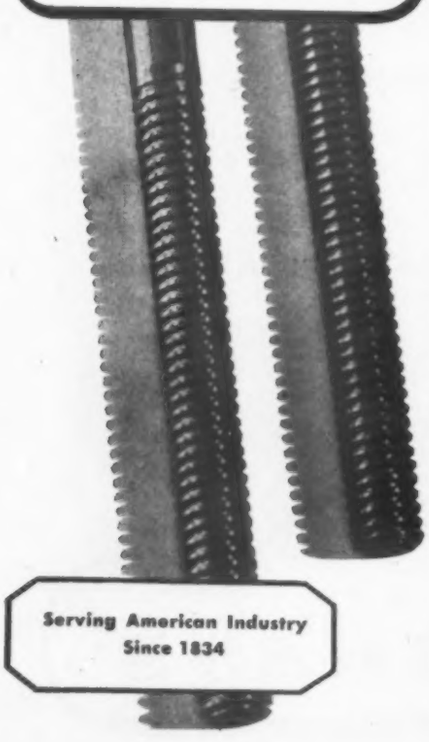
RITCO special screws and studs are accurately made in any metal — any thread — in sizes to 2½" diam. Our facilities . . . complete and modern . . . are available to produce these parts machined to your specifications.

Estimates gladly submitted.

REMEMBER RITCO FOR

Drop and Upset Forgings
Complete Machining Facilities
Special Bolts, Nuts and Studs
Milled Body Bolts

RHODE ISLAND TOOL CO.
148 WEST RIVER ST., P. O. BOX 1516
PROVIDENCE 1, RHODE ISLAND



Serving American Industry
Since 1834

NEW GIANT ELECTRIC MOTORS

Westinghouse Electric Corp., Pittsburgh, Pa., discloses that engineering work has commenced on four of the world's most powerful single alternating current electric motors for the irrigation project at Grand Coulee Dam in the state of Washington. Each as big as a six-room house, the motors will have a rating of 65,000 horsepower—as powerful as ten of the mightiest locomotives.

Completely dwarfing anything ever attempted along this line, the completed motors will each weigh 325 tons, with the rotor, or rotating part, alone tipping the scales at 172 tons. Teamed with giant pumps, each motor will force 607,000 gallons of water a minute through an 850-foot-long tunnel leading to a reservoir. Each motor will move enough water to supply the requirements of a city the size of New York.

UNIQUE USE OF FORK TRUCK IN STEEL SCRAP DISPOSAL

An ever-present problem in any metal fabricating plant is the disposal of quantities of scrap which must be moved constantly to clear the production department and bring in scrap revenue.

Many methods have been devised, but one of the most unique and economical is that used by Edward Valves, Inc., of East Chicago, Indiana. A tilting dump

The fork truck picks up loaded scrap truck for dumping

body mounted on an ordinary four wheel truck picks up the scrap at points around the plant. When the dump truck is full a fork truck picks up truck, scrap and all and carries it to a truck trailer, kept standing for the purpose. The fork truck carries the load onto the trailer, dumps the scrap and returns the truck to be loaded again. The system requires a minimum of handling and moves a maximum of scrap quickly. Fork truck illustrated is made by Clark Tructractor, Division of Clark Equipment Company, Battle Creek, Michigan.

ELECTRIC CIGARETTE VENDOR

An all electrically operated cigarette vending machine, called the "Electro", particularly adapted to the needs of industrial plants, is announced by C-8 Laboratories, Newark, N. J. The machine is said to be faster operating and

(*Please turn to Page* 200)

EAGLE
Welded Steel
BENCH OILERS

originated the welded steel bench oiler forty years ago!

- body of one-piece seamless steel
- reinforced insert type spouts with welded seam
- machine cut threads
- bottoms electrically welded to bodies
- made with straight, bent or flexible spouts
- sizes 1/3, ½, ¾, and 1 pint capacities

Order from your Distributor

Eagle Manufacturing Co.
Wellsburg, West Virginia

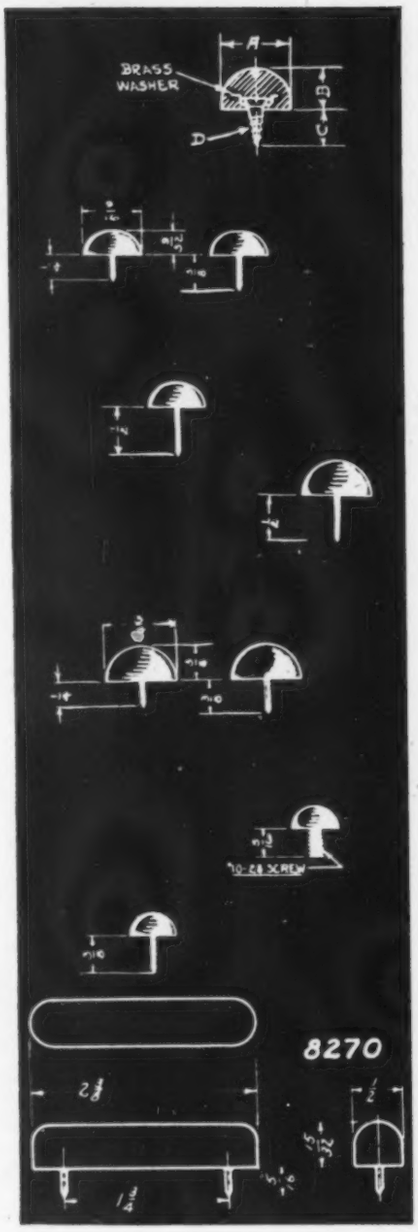
no matter what the shape!

MECHANICAL RUBBER PRODUCTS COMPANY
733 E. 150th Street, New York 55, N.Y.

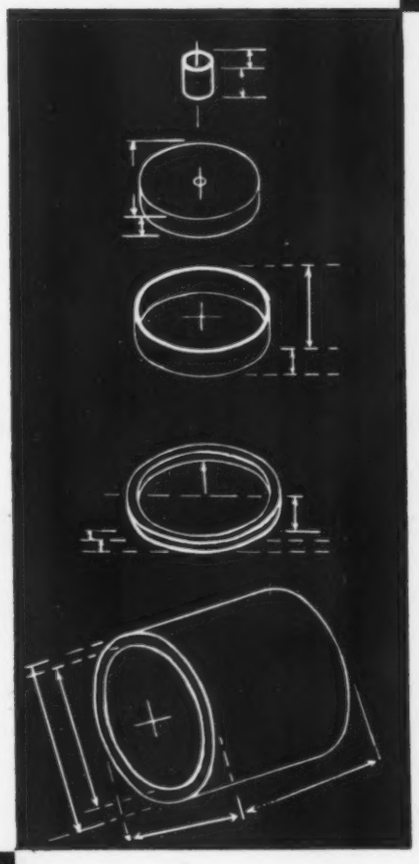
Can Supply Your Rubber Needs

Sponge Rubber, Gaskets,
Packing, Sheet Stock,
Gloves, Extrusions, Moldings

NEOPRENE • HYCAR • BUNA S.
• BUNA N. • GUM RUBBER •



we can make these for you **NOW**



if it's rubber . . . it's H.O. Canfield

444 Madison Ave., New York 22

LATHE CUT parts — all sizes and shapes . . . NOW! BUMPERS — tack bumpers, screw bumpers, bar bumpers . . . NOW! Yes! You get good delivery on these hard-to-get rubber items . . . NOW! Order all your requirements.

If you need any rubber part — molded, die-cut, or extruded — big, small, simple, or intricate — made to your specifications or from stock molds . . . write or wire the H. O. Canfield Company. NOW!

FREE New H. O. Canfield general catalogue. Illustrates thousands of rubber parts made for all industries. Send for your copy today!

MONOBELT

PATENTED

. . . the Leather Belt that takes your toughest assignment in stride

This modern leather belt offers distinctive and exclusive features that give it exceptional efficiency, anywhere in your plant. All over the country, Monobelt is doing an outstanding job, on long or short drives, in reducing power and belt costs, no matter how tough the spot in which it is placed.

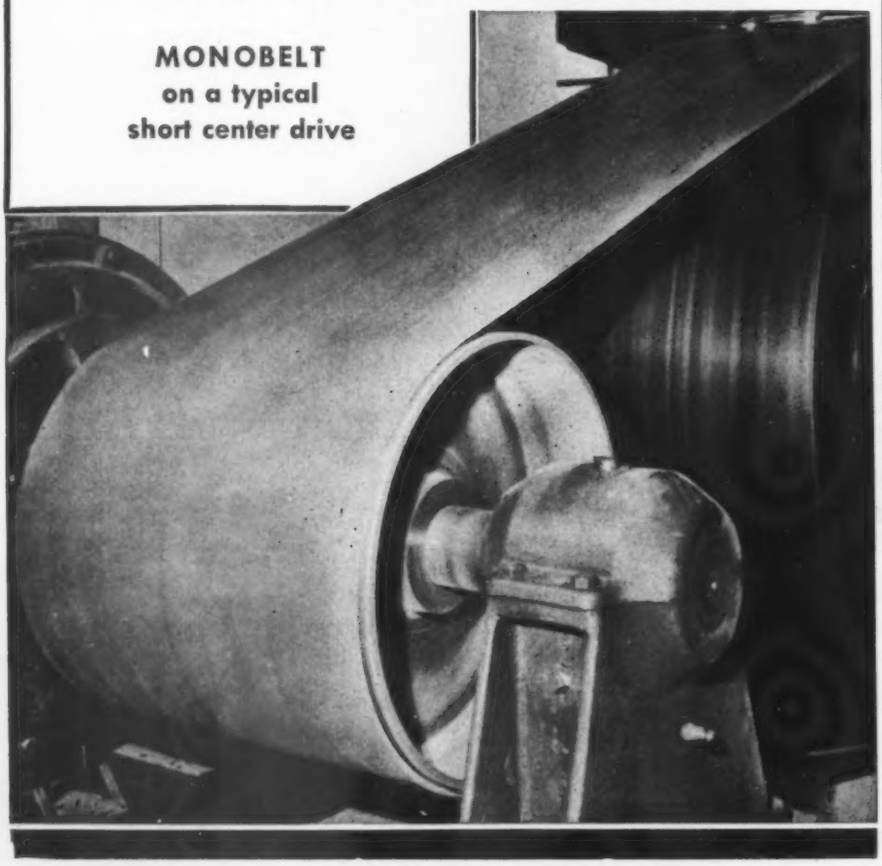
Every process in the engineered construction of Monobelt is directly under Alexander control from the raw hide to the finished product. Monobelt is made in all widths, each in the ideal thickness for best performance.

Send for the new MONOBELT Folder

ALEXANDER BROTHERS

406 N. Third Street, Philadelphia 23, Pa.

MONOBELT on a typical short center drive



(*Continued from Page* 198)

less complicated than the conventional type coin vending machine, and operates on either AC or DC current, dispensing eight brands of cigarettes in regular and king sizes. The machine operates at the touch of a button, has comparatively few parts, and requires a minimum of servicing. It is manufactured in eight colors, weighs 200 pounds, and stands 44 inches high, 24 inches wide, and 12 inches deep.

DRILL CHUCK SELECTOR

Selecting exactly the right drill chuck for any straight shank drill is made easy by means of a "slide-rule" type selector

available from Scully-Jones & Co., 1956 South Rockwell St., Chicago, without cost.

With one simple setting of the selector, it is possible to determine instantly the catalog number of the Style "B" drill chuck to be ordered, thus providing a time-saver for buyers, engineers, draftsmen, toolroom supervisors and machine operators requisitioning drivers. The selector also shows recommended speeds and feeds for drilling various types of materials.

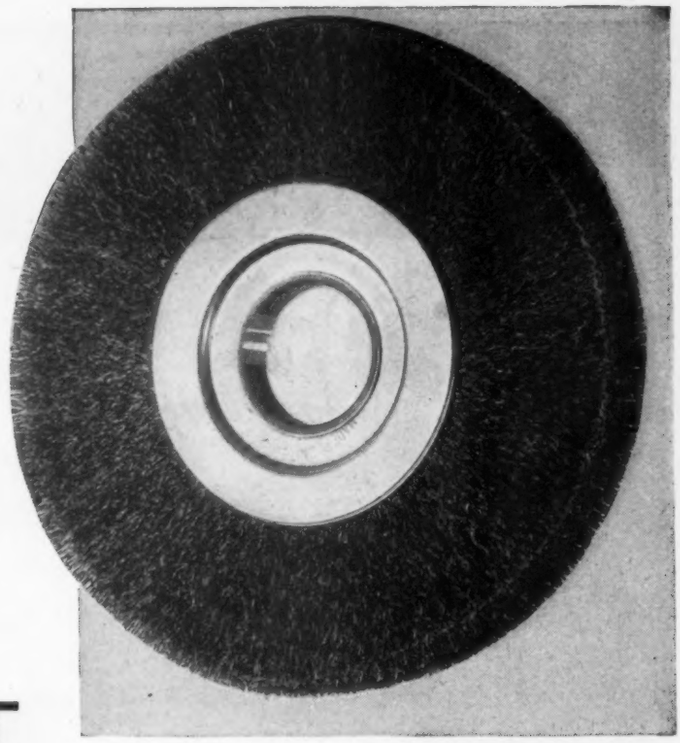
STEEL PRODUCTION LOSS FOR 1946

According to Irving S. Olds, chairman of the board of directors, United States Steel Corp., the steel industry lost at least one-fifth of its expected production for 1946 due to the steel strike at the beginning of the year and the effects of the disasterous coal strikes in the Spring and late Fall. This loss amounted to around 16,000,000 tons of ingots. The production programs of all principal users of steel were severely retarded accordingly.

INDUSTRIAL FINISHING EXPOSITION

A feature of the 1947 annual convention of the American Electroplaters Society, scheduled to be held in Detroit, Mich., June 23-27, will be an Industrial Finishing Exposition for the display of the latest ideas in finishing practices together with the most modern equipment available in this field.

(*Please turn to Page* 202)



For Super Fast Cleaning and Finishing...

WITH EXTRA

L-O-N-G L-I-F-E

AND ECONOMY

Thor WIRE WHEEL BRUSHES

IMMEDIATE DELIVERY FROM DISTRIBUTORS STOCKS

Firmly anchored to the core by a patented, strength-adding process, the Double-Durable special crimp wire which fills Thor Wire Wheel Brushes has above-average resistance to crystallization and breakage. It holds its strength longer for continued efficiency in cleaning, de-burring, roughing and burnishing. Used on portable or stationary equipment with spindle speeds up to 6000 r.p.m., these Thor brushes do better work with maximum economy.

Made in sizes from 4" to 12" diameter, with wire from 30 to 36 gauge, Thor brushes are available in single-unit, arbor-hole adaptor or metal-center sectional types. A new Thor folder, No. 538, makes selection of the proper brushes for your jobs simple. Write for your FREE copy . . . today.

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. Jackson Boulevard, Chicago 6, Illinois

Birmingham Boston Buffalo Cleveland Detroit Los Angeles Milwaukee New York Philadelphia
Pittsburgh St. Louis Salt Lake City San Francisco Toronto, Canada London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

ALLEN TRU-GROUND

DOWEL PINS

support accurate tool and die work

They serve as locating pins for the diemaker's work — and then go on to general duty as pins and pivots in various machine assemblies. By their accuracy and strength they *retain* precision standards in tool and die assemblies under punishing stresses.

They are ground to a limit of .0002" over basic size, with an allowable tolerance of plus or minus .0001". Surfaces are finely polished; subsequently treated with a rust-preventive.

Metallurgically in a class with ALLEN Hex-socket Screws: — made of the same special-analysis *ALLENOY* steel, heat-treated to an extremely hard surface, with a core of the right toughness to prevent "mushrooming" when driven into a tight hole... Tensile strength, 240,000 to 250,000 lbs. per sq. inch... Typically the Allen high safety-factor in HOLDING-POWER.

Ask your local ALLEN Distributor for samples and dimensional data... the same Distributor who serves you dependably with Allen Hex-socket Screws and other first-call mill supply lines.

TRADE MARK

THE ALLEN MANUFACTURING COMPANY
HARTFORD 1, . . CONNECTICUT, U. S. A.

ANNOUNCE VOLUME PRODUCTION OF TRANSPARENT MIRRORS

Volume production of transparent mirrors is announced by Libbey-Owens-Ford Glass Co., Toledo, Ohio, which foresees extensive use of the mirror in commercial enterprises, public institutions and homes. The transparent mirror functions as a reflective surface when seen from one side and simultaneously as a window when viewed from the other. Among the suggested uses are "security" windows in banks, brokerage offices, post offices and department stores. Key to the transparent mirror's performance is the almost incredible thinness of the film of chromium alloy with which it is mirrored. While constituting an effective reflecting surface it also permits passage of light. The film is four ten-millionths of one inch thick.

CONTAINER LINERS FOR SHIPPING SOLID CHEMICALS

Announcement is made by the Dow Chemical Company, Midland, Mich., that Saran film, type M, a tough, flexible, one-ply, transparent material with extremely high resistance to water and moisture vapor transmission, is again available. As container liners for shipping solid

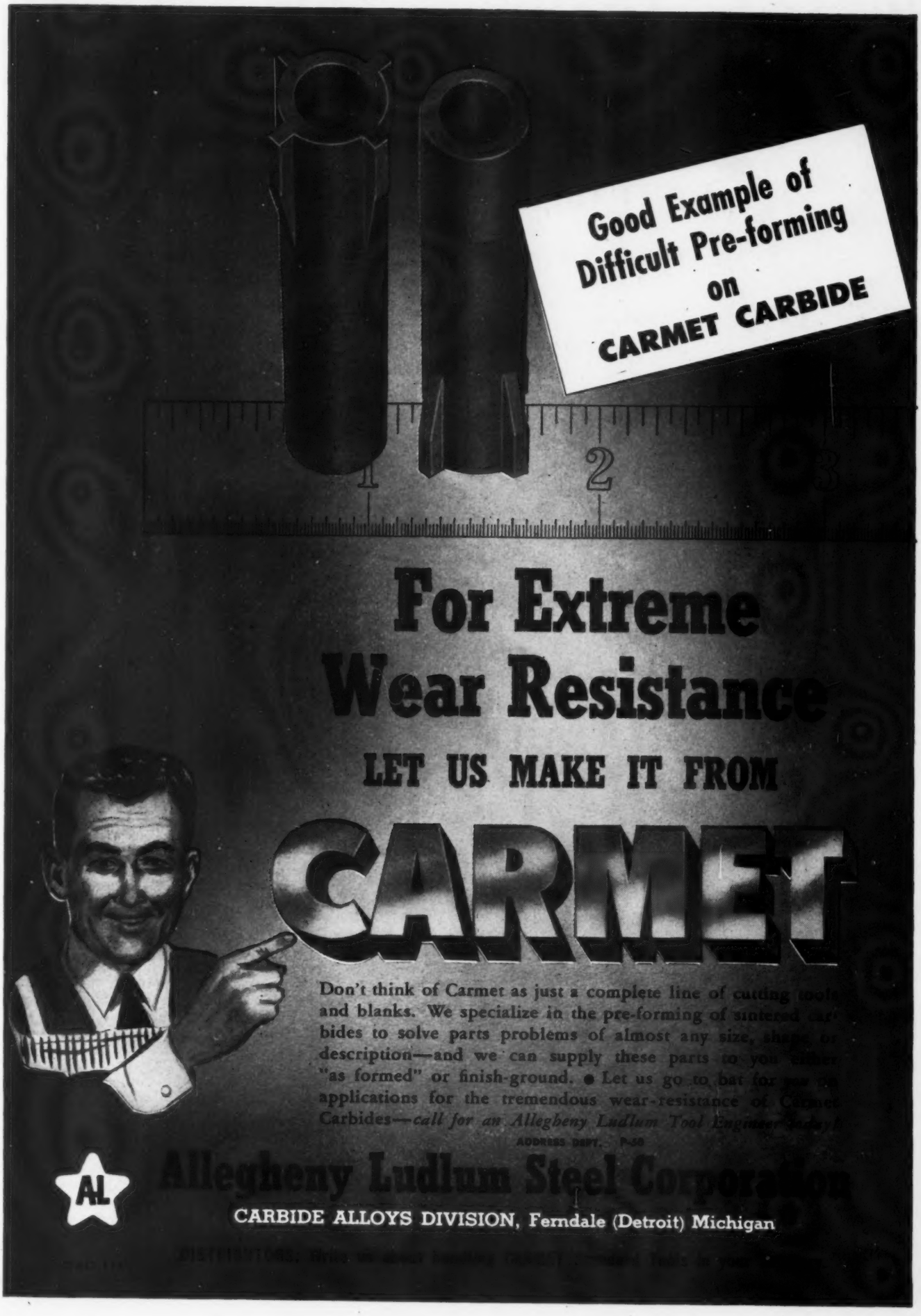
Tubes are tied at bottom before being filled.

chemicals, acids, organic materials and hygroscopic products, the type M is especially suited because of its chemical and acid resistance. The film is available in seamless tubes ranging from 6 inches to 32 inches in size, and in increments of two inches. When using the tubes for containers liners, one end is tied and tube placed in container for filling, top being tied upon completion of filling.

NON-TOXIC ROACH KILLER

Arfax PCH Insect Killer, a non-toxic exterminating powder, harmless to humans and other warm-blooded animals, has been introduced by Fairfield Laboratories, Inc., Arfax Division, Plainfield, N. J. It is said to possess amazing toxic affinity for cold-blooded insects, including roaches, silverfish, ants, waterbugs, centipedes, etc. Any contact with the powder quickly induces paralysis, resulting in death to the insect. The powder can be applied with any inexpensive dust gun. It is available in 1, 5, and 25 lb. containers.

(*Please turn to page* 204)


Good Example of
Difficult Pre-forming
on
CARMET CARBIDE
For Extreme
Wear Resistance
LET US MAKE IT FROM
CARMET
Don't think of Carmet as just a complete line of cutting tools and blanks. We specialize in the pre-forming of sintered carbides to solve parts problems of almost any size, shape or description—and we can supply these parts to you either "as formed" or finish-ground. ● Let us go to bat for you on applications for the tremendous wear-resistance of Carmet Carbides—call for an Allegheny Ludlum Tool Engineer today!
ADDRESS DEPT. P-50
AL
Allegheny Ludlum Steel Corporation
CARBIDE ALLOYS DIVISION, Ferndale (Detroit) Michigan

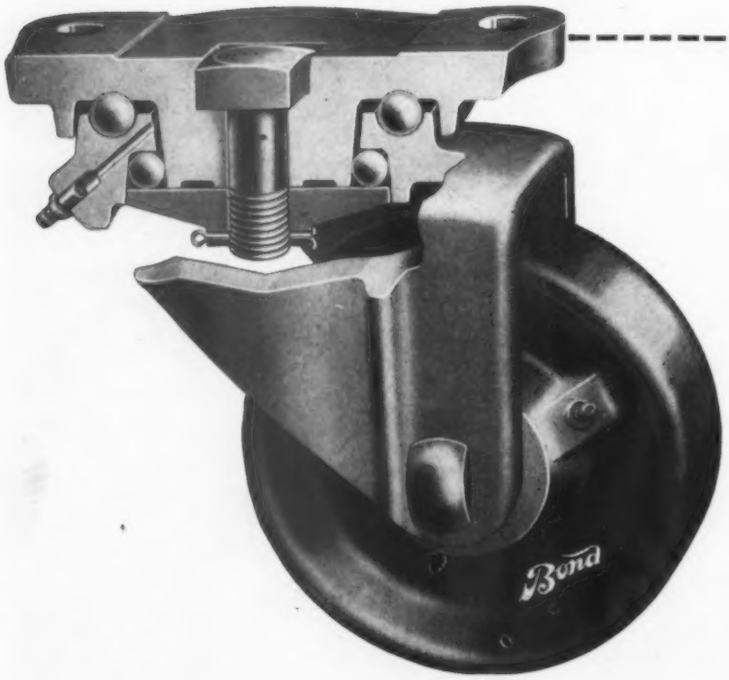
HERE'S THE Bond CASTER
REG. U.S. PAT. OFF.
THAT "CUTS CORNERS"
TO CUT YOUR COSTS

EASY swiveling Bond 136-A casters permit trucks to be turned in minimum space . . . eliminate waste motion. Sturdy, built of durable Bond caster metal, they are designed to roll up long service records.

How much service a caster will render—how efficiently it will perform—depends on its suitability for actual operating conditions. Are your casters precisely right? Rely on the considered judgment of Bond engineers. Recommendations are always impartial because there is a Bond caster for every industrial purpose. Write for catalog K-36.

BOND FOUNDRY & MACHINE CO.
MANHEIM, PA.

Bond 136-A Caster. Special double ball race design assures easy swiveling. Durable Bond caster metal provides extra long-life. Roller bearing semi-steel wheel. Pressure lubricated. Wheel sizes from 4" to 12" dia.; load capacities from 600 to 1700 lbs. per caster.



MANUAL FOR HEAT TREATING SERVICES

Loose-leaf entitled Manual for Heat Treating Services, 8½ x 11", with illustrations, designed to help manufacturers get the full advantage of commercial heat treating services by informing them of the range of heat treating services, has been published by the Metal Treating Institute, 420 Lexington Avenue, New York 17, N. Y. The price is $4.00. It contains several sections which deal with steel selection, peacetime NE steels, machinability, grinding, relationship between heat treatment and design, basic principles of heat treating, describes various heat treatments, non-ferrous heat treating and brazing, cold treating, preparation and care of steel surfaces, inspection and testing, how to order heat treating, and a glossary of metallurgical terms.

SELECTOR-GUIDE ANSWERS FIRE EXTINGUISHER QUESTIONS

Illustration shows selector guide offered by Randolph Laboratories, Inc., 8 E. Kinzie St., Chicago, without cost, which condenses 222 fire facts in handy-vest-pocket size unit. The selector answers such questions as: "What is the range of a 5 gallon Pump Tank fire extinguisher?" "Will our Soda-Acid extinguishers freeze in low temperatures?" "How often must we refill a Foam unit?" "Does a Carbon Dioxide extinguisher smother gasoline fires?" "How do you operate a Dry Powder extinguisher?" Various questions are answered as the selector card slides out. The guide also presents facts about the suitability, maintenance and performance of soda-acid, foam, pump tank, dry powder, loaded stream, carbon tetrachloride and carbon dioxide fire extinguishers. Reverse side of guide tells, in relation to plant fire hazards, how high units should be bracketed, maximum distances of the extinguishers from the operator, and the area protected by each unit. Single copies mailed free; quantities supplied on request.

MOBILE LABORATORY FOR INCOMING STEEL ANALYSIS

On-the-spot steel analysis is now routine at the Rouge plant of the Ford Motor Company, thanks to a mobile laboratory unit designed and developed by the company's chemical and metallurgical research department.

The new unit, already paying rich dividends as a time saver, is used mainly for the rapid semi-quantitative analysis of incoming carloads of steel scrap and

(*Please turn to Page* 206)

"Tops in '26...even better today"

WHEN plant changes or expansions call for new circuits—the electrician knows it will be easy to modify any BullDog SafToFuse Panelboard . . . the flexible panelboard with interchangeable fuse units.

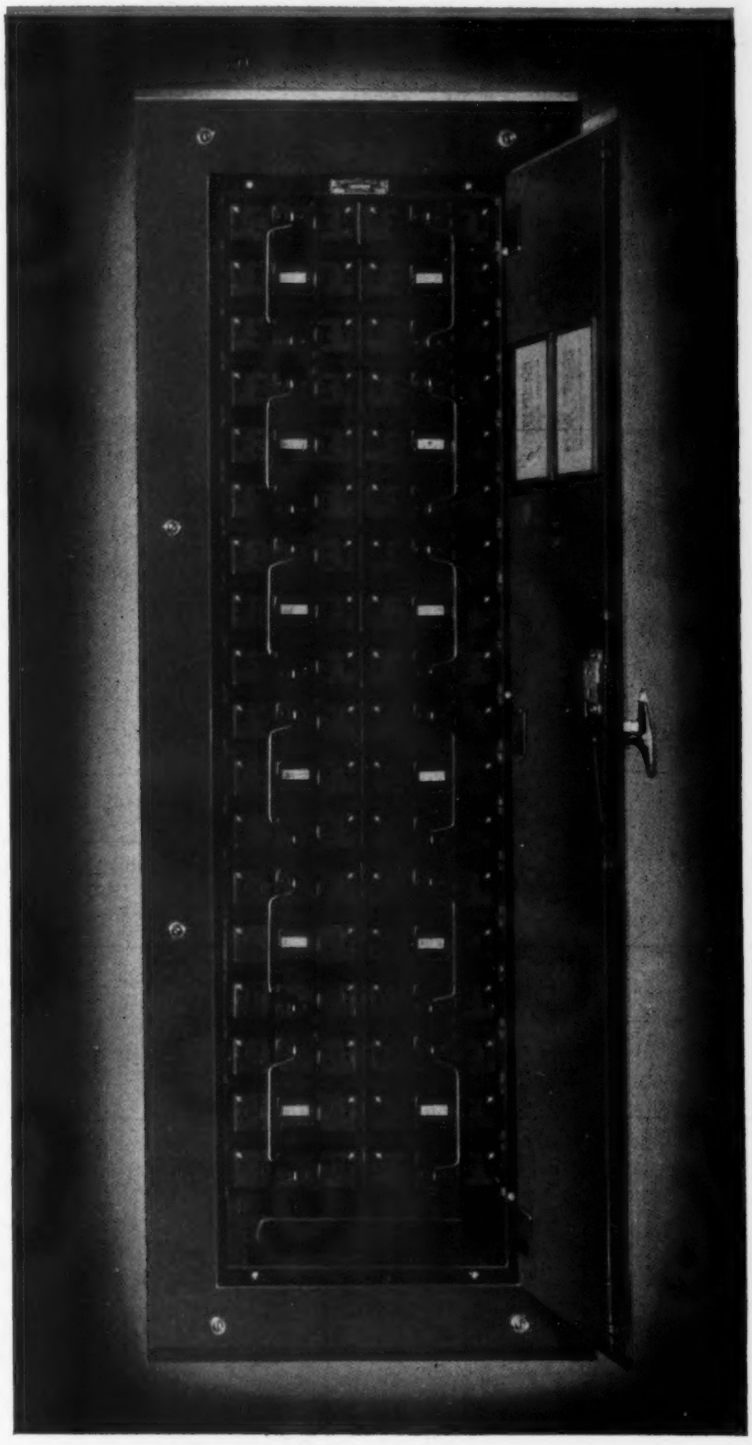
BullDog SafToFuse Panels are compact—primarily intended for those installations where space is at a premium. Because SafToFuse units are standardized, supplemental units can be added, or units of different capacities can be substituted with a minimum of expense and delay.

All current carrying parts and fuses are fully shielded when in service . . . no chance for an accidental contact. If it becomes necessary to replace a fuse or disconnect the circuit, the fuses are removed by pulling out the SafToFuse "head" . . . double protection; also eliminates the need of auxiliary "fuse pullers." Moreover, provisions are made to test fuses—without current disconnection —through holes in the face of the unit.

For maximum flexibility and interchangeability in power distribution, specify BullDog SafToFuse Panelboards . . . tops for twenty years. They'll help you stop your power problems before they start.

A BullDog Field Engineer will appreciate an opportunity to demonstrate the advantages of SafToFuse Panelboards and show you an installation near your own plant. Call him today, or write BullDog direct.

• • •



BullDog manufactures Vacu-Break Safety Switches—SafToFuse Panelboards—Superba and Rocker Type Lighting Panels—Switchboards—Circuit Master Breakers—"Lo-X" Feeder BUStribution DUCT—"Plug-in" Type BUStribution DUCT—Universal Trol-E-Duct for flexible lighting—Industrial Trol-E-Duct for portable tools, cranes, hoists.

BULLDOG

ELECTRIC PRODUCTS COMPANY

ADEQUATE WIRING SERVES AND SAVES

DETROIT 32, MICHIGAN. FIELD OFFICES IN ALL PRINCIPAL CITIES. IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

"HEY, YOU'RE STILL WEARIN' YOUR GOGGLES!"
COMFORTABLE HEAD BAND
BROAD-BEARING NOSE-REST
RESTS GENTLY AT ALL POINTS
DIRECT AND INDIRECT VENTILATION
QUICK, SIMPLE ADJUSTMENT
WORKERS HARDLY KNOW THEY HAVE CESCOS ON

• Honestly, workers hardly know they're wearing CESCO cup-type goggles. That's because CESCO cup-type goggles are *designed* to be *worn comfortably*. They fit as they should. The cups rest gently at all points—on the eyebrow, nose bridge and cheekbone. No pressing discomfort. No pinching. Broad-bearing nose-rests "float" the cups and add to ease of wearing. Quick, simple bridge adjustment assures comfortable fit on varying facial contours.

• You'll prove these points for yourself after you order CESCO cup-type goggles. Write now.

CHICAGO EYE SHIELD COMPANY
2320 Warren Boulevard
Chicago 12, Illinois

CESCO
FOR SAFETY

(*Continued from page* 204)

kindred operations in which time is of the essence.

The technique eliminates the necessity of transporting the samples of steel scrap to the chemical laboratory, obtaining drillings, and analyzing them chemically. A portable spectroscope provides a method of analysis by visual inspection on location.

Mounted on a Ford panel delivery truck, the special equipment consists of a spectroscope, chemical spot testing and color carbon test equipment, a portable grinder for spark testing, and a gasoline-driven generator as a source of power.

Still another important function of the mobile unit is its usefulness in the non-destructive identification and sorting of finished production parts of identical appearance but different chemical analysis.

ROBOT "FINGERPRINT" DEVICE IDENTIFIES UNKNOWN SUBSTANCES

An instrument that completes in minutes or hours complicated molecular studies that would ordinarily require days or weeks, has been developed by Dr. Donald K. Coles of the Westinghouse Research Laboratories. The device automatically identifies unknown substances by taking their chemical "fingerprints", and is known as a double high resolving infra-red spectograph.

Key to the fingerprinting is the fact that all molecules in matter vibrate at certain characteristic frequencies, millions or even billions of times a second. Dr. Coles beams heat rays, which lie in the infra-red region of the spectrum and which also vibrate over a range of frequencies, through a sample substance. When the frequency of the rays coincides with that of the elements in the substance, he explains, some of the infra red radiation is absorbed. When a particular wave length or frequency of radiation is absorbed, it is evident that a certain structural element is present in the sample, the amount present being determined by the amount of absorption.

CARBON MONOXIDE ALARM

Carbon Monoxide Alarm, designed for efficient protection against dangerous concentrations of carbon monoxide in the air—around blast furnaces, in steel mills, chemical plants, garages, for bus and truck fleet operators—is featured in a new 4-page bulletin, No. DR-3, published by Mine Safety Appliances Company, Pittsburgh, Pa.

The M. S. A. carbon monoxide alarm operates continuously, giving both visible and audible warning when carbon monoxide concentration in air reaches a predetermined level. Predetermined settings can be made for concentrations as low as .02% (2 parts per 10,000)—a point at which a few hours exposure would be required to produce the first symptoms of carbon monoxide poisoning.

The alarm draws a continuous sample

(*Continued on page* 208)

Darnell Casters

Nearly 4000 TYPES of CASTERS & WHEELS

A SAVING AT EVERY TURN

DARNELL CORP. LTD
LONG BEACH 4 CALIFORNIA
60 WALKER ST. NEW YORK 13 N.Y.
36 N. CLINTON CHICAGO 6 ILL.

On this 300 ton Warco Eccentric Gear Press, with pneumatic die cushions in bed, Colgate deep draws parts using blanks up to 44" x 70" to a 10" depth.

Add these facilities for volume forming and stamping of metal

Without Increasing Overhead!

To buy the machinery and build the additions to your plant necessary for sheet metal forming, stamping and fabricating would cost—how much? Yet you can add this extra function *without adding to overhead*—by making Colgate your "sheet metal department."

Colgate has complete facilities—up-to-date forming and stamping equipment, experienced labor, and plenty of working space—for the precision manufacture of production parts and even complete units *in quantity.*

Integrated to your assembly lines, Colgate's diversified facilities can save production time and reduce manufacturing costs.

If you have a "tough" assembly to produce in volume, or are merely pressed for time or space, call in Colgate. Specialists in the light metals, and geared for mass-production, Colgate will *deliver the goods* on time (or ahead of schedule) and, more than likely, at a lower cost than you could handle the job if you had a sheet metal department of your own.

Specialists in Fabricating and Stamping Aluminum, Magnesium, Stainless Steel and Other Light Metals.

COLGATE

Globe Woven Belts are more than a manufactured product. Globe Belts are the outcome of practical research on every particular use to which they may be put. Globe Belts are the result of experienced, painstaking workmanship by artisans who know and like their job of making quality beltings. Globe Belts have proved their long-wearing material and efficient operation.

Yes—there's a world of difference in GLOBE Woven Belts. It will pay you to find out.

There's a 'specially engineered and tested-by-use Globe Woven Belt for practically every need of industry. For instance:

KANRY-TEX: The superior belting for food processors.

SOLID WOVEN WHITE COTTON: "Tops" for light conveyor purposes.

ENDLESS WOVEN: No slippage: no vibration —for high-speed use.

CELLULOSE-COATED: For bakery and candy manufacturers.

Many other GLOBE beltings are available for whatever particular use you may have. Your mill supply house (or we ourselves) will be glad to provide a complete list of GLOBE products. And at the same time give you proven facts and figures on their long-lasting and economical qualities.

GLOBE WOVEN BELTING CO.
1898 CLINTON STREET BUFFALO 6, NEW YORK

(*Continued from page* 206)

of the surrounding air and forces it over a catalyst which oxidizes all carbon monoxide to carbon dioxide. The heat of reaction is measured by thermocouples and indicated on a contacting meter dial in terms of carbon monoxide concentration. When the concentration reaches the predetermined meter setting, an alarm horn sounds and a red light jewel is illuminated. Both signals continue to operate until the instrument is manually reset.

Completely self-contained in a weatherproof case, the alarm requires only connection to a proper rated source of power. It consumes no more current than a 100 watt bulb and is equipped with brackets for wall mounting.

NEW CLAD STRIP ANNOUNCED BY SUPERIOR STEEL CORP.

The development of rolled nickel and Monel clad strip which combines the corrosion resistance and strength of nickel with the properties of steel, and costing approximately 30-35 percent less than solid nickel or monel strip, is announced by the Superior Steel Corp., Carnegie, Pa.

This composit strip is available in widths between ¼" and 10¼", in coils ranging up to several hundred feet depending upon the gauge. In the cold rolled condition it is produced in thicknesses between 10 and 125 one-thousandths of an inch. In the hot rolled condition it is available in thicknesses between 95 thousandths and ¼ of an inch.

Depending on requirements, the clad strip is furnished with cladding on one or both sides. The standard cladding thickness is 10 percent of the total thickness. Thus on the single clad strip the nickel or monel would represent ten percent of the total thickness and the steel 90 percent. On double clad strip there would be three layers—10 percent nickel or monel, 80 percent steel, and 10 percent nickel or monel.

An inseparable bond between the steel base and the cladding permits welding, stamping, drawing, and all other means of fabrication used with steel. As the thermal coefficient of expansion of nickel, monel and steel are nearly the same, it is said there is little danger of warping or twisting in applications where temperature changes are encountered.

PENNSALT SETS UP PACKAGING AND LABELING DIVISION

Expanding its activities in the field of chemical specialties and chemical products, the Pennsylvania Salt Manufacturing Co., Philadelphia, Pa., has established a new Packaging and Labeling Division. George W. Benbury, packaging engineer, who served in the U. S. Navy during the war, and is an engineering graduate of North Carolina State College, has been named manager of the new division. He has been associated with Pennsalt since 1933.

(*Please turn to Page* 210)

TOP QUALITY THROUGHOUT

20,000 DIFFERENT SIZES AND SHAPES

From full-formed heads to clean sharp threads, Republic UPSON quality is *always* TOP quality. Why? Three reasons: Finest raw materials . . . complete manufacturing facilities . . . and skilled craftsmanship, backed by one hundred years of bolt-making experience.

REPUBLIC STEEL CORPORATION
BOLT AND NUT DIVISION • CLEVELAND 13, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC *Upson Quality* BOLTS AND NUTS

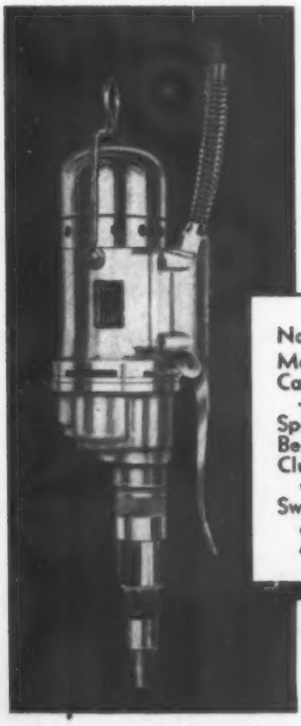
Other Republic Products include Pipe, Sheets, Tubing, Hot Rolled and Cold Drawn Bars—Carbon, Alloy and Enduro Stainless Steels

"Dyno-Mite" ELECTRIC SCREW DRIVER and NUT RUNNER
Motors: Universal for D.C. or A.C. 25 to 60 cycles
Capacities: Wood screws up to 1½", machine screws from No. 10 down to No. 2
Clutch: New "Adjustomatic" selective torque
Gears: Heat-treated chrome nickel steel
Ball Bearings: Throughout
Switches: Patented quick make and break with quick releasing lock

AT YOUR SERVICE

Millers Falls "Dyno-Mite" Screw Drivers and Nut Runners are serving industry well in the current production battle. Because they are small but powerful, light but efficient, their capacity for work seems almost unlimited.

Quick adjustability and extreme flexibility together with surprising lack of vibration give these "Dyno-Mite" Screw Drivers greater load capacity, higher efficiency, and greatly lengthened clutch and tool life. These add up to greater output at lower costs for industry — for *you*.



AND THERE ARE MANY MORE

There is a full line of Millers Falls Electric Screw Drivers to handle any screw driving problem. All have *proved* their ability to handle a wide variety of jobs. You will be interested in the many unique features which make these Millers Falls tools ready to serve you well. Write for complete information.

No. 50 — BALL BEARING SCREW DRIVER
Motor: Universal for D.C. or A.C. 25 or 60 cycles
Capacities: Wood screws from No. 2 to No. 10 — 1½", Machine screws up to No. 12
Speeds: 800, 1200, 2000 or 3000 R.P.M.
Bearings: Ball bearing Armature and Spindle
Clutch: Patented "Adjustomatic" with smooth vibrationless action
Switches: Operated by slight turn of nickel plated cap; hand or foot control, for fixed bench operation

One Thing in Common — Quality!

MILLERS FALLS TOOLS SINCE 1868

MILLERS FALLS COMPANY
GREENFIELD, MASSACHUSETTS

NEW MACHINES AND METHODS FORECAST FOR 1947

An outstanding characteristic of 1947 will be an intensified drive by U. S. industry to increase its productive capacity and cut costs with better machines, according to William L. Batt, president of SKF Industries, Inc., who based his forecast on the unprecedented demand for anti-friction bearings for use in the new machinery and equipment being ordered by industry. He also added that market forecasts and current book orders indicate a continued demand for anti-friction bearings substantially above pre-war levels.

"By the middle of 1947, this new, efficient machinery should begin to appear and start working to lift America's productive capacity and to help manufacturers in their battle against rising costs," he declared.

Need For Increased Mechanization

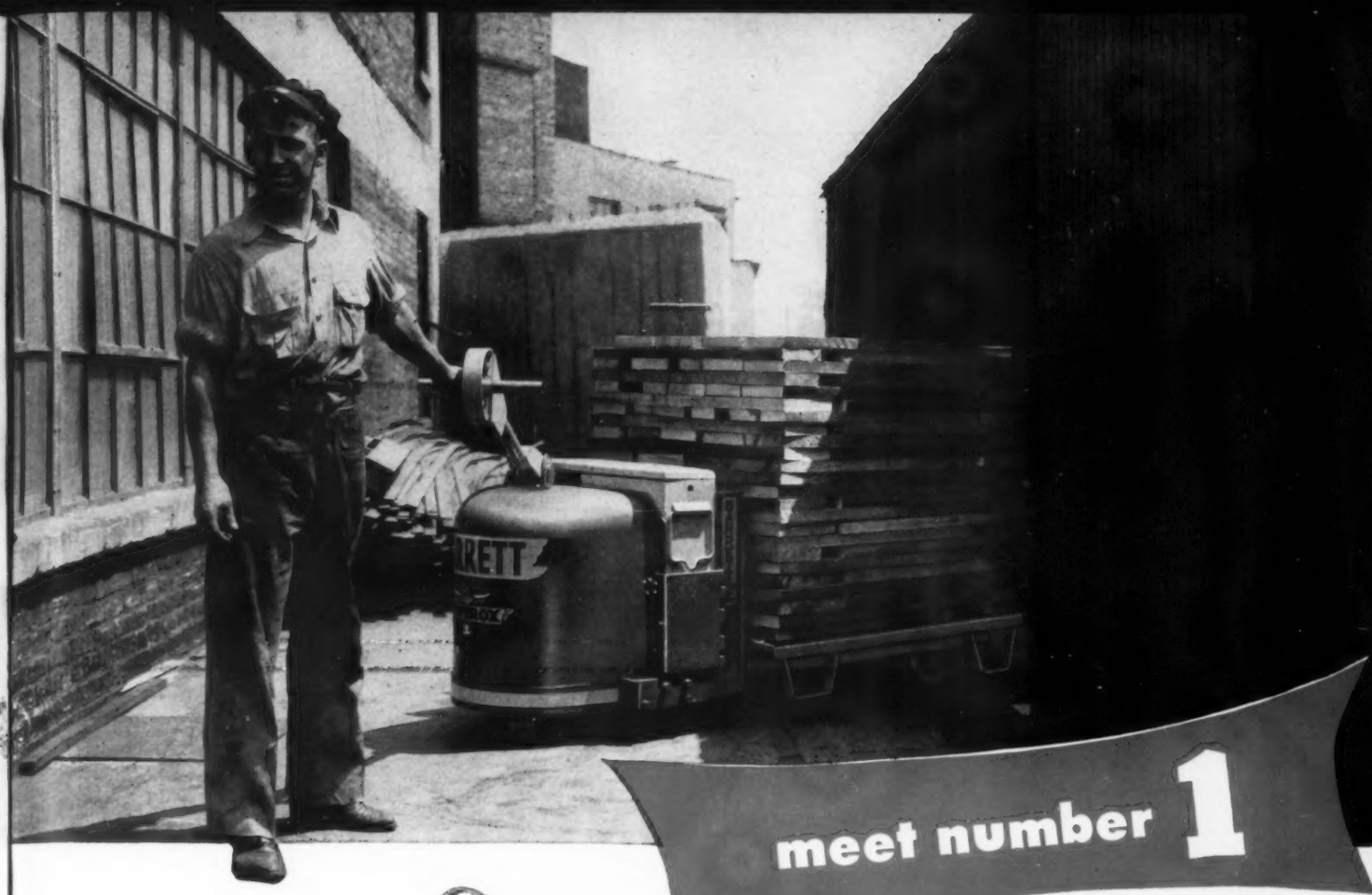
Mr. L. M. Cassidy, vice president for sales, Johns-Manville Corp., which is engaged in a $50 million expansion and improvement program, in recent press statement, said: "We are now entering one of the most dynamic phases our industrial economy has ever seen. We can anticipate a rapid obsolescence of machinery and methods, as this country's industries install new machinery and adopt new methods of manufacture to capture their markets. Particularly due to the unprecedented rise in production costs, a wave of increased mechanization and industrial plant stream-lining has become almost a vital necessity to keep prices within consumer buying limits. In 1946 government controls and labor unrest impeded much of the progress which might normally have been expected, but for the next four or five years there is the prospect of a substantial volume of activity in the manufacturing and heavy construction industries."

STEEL RIVETS STANDARDS

Simplified Practice Recommendation, "Steel Rivets", R-221-46, covering steel rivets, is announced by the Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C. The recommendation, developed in cooperation with manufacturers, distributors, users, and other interested groups, establishes a voluntary simplified list of recommended standard stock production sizes for small rivets having round heads, flat head, truss or wagon box head, and countersunk head; also, belt rivets, tinner's and cooper's rivets, and large rivets with button head. Among other things, purchasers and users are provided with a guide to sizes of rivets that are readily available from stock.

COLLOIDAL WATER CONDITIONING

Colloidal water conditioning and case history of its application in the power plant of the U. S. Military Academy, West Point, N. Y., is described in four-page reprint available from the American K.A.T. Corporation, 331 Madison Avenue, New York, N. Y.



meet number 1

the 1947 POWEROX *first* in power lift-trucks!

What makes it first? Look:

LOW COST . . . The PowerOx sells well below other heavy-duty trucks.

BIG CAPACITY . . . Your choice of two models —4000 and 6000 lbs.

SIMPLE OPERATION . . . With PowerOx finger tip control, one hand in one position controls the two speeds forward, two reverse, raising, lowering, steering, and braking!

QUICK LIFT . . . PowerOx raises the load electrically—4 inches in 4 seconds!

SMOOTH TRAVELER . . . Heavy duty motor drives the PowerOx at steady walking pace—no speed-ups or lagging.

EASY STEERING . . . The PowerOx handle turns through 270 degrees under full power—shorter turns than any other truck!

SURE BRAKING . . . Brakes respond instantly with handle up or down!

HIGH CLEARANCE . . . The PowerOx can't snag on inclines, door sills, etc.

Plus: This 1947 PowerOx is built by the world's biggest manufacturer of hand lift-trucks. For full details, write

BARRETT-CRAVENS COMPANY

3280 West 30th Street • Chicago 23, Illinois

Representatives in All Principal Cities

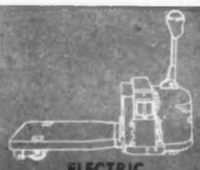
Canadian Licensee: S. A. Armstrong, Ltd. • Toronto, Canada

NATIONAL MATERIALS HANDLING EXPOSITION
PUBLIC AUDITORIUM
CLEVELAND
JAN. 14-17, 1947

BARRETT

ONE MAN DOES MORE THAN 3 OR 4 . . . WITH A BARRETT

Barrett Handling Equipment


ELECTRIC LIFT-TRUCKS

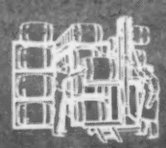
HAND LIFT-TRUCKS

SKIDS

BARREL TRUCKS

NIFTY SYSTEMS

PORTABLE ELEVATORS


STEEL STORAGE RACKS

NOTICE

TO PURCHASERS OF GOV'T SURPLUS MACHINE TOOLS

your machines can be rebuilt and modernized to perform like new at low cost with

BOTWINIK BROS.
GUARANTEED REBUILDING SERVICE

Many war surplus machines have been operated under grueling, 24-hour schedules by improperly trained personnel *without* being overhauled. Botwinik's rebuilding service restores machines to perform with the accuracy of new equipment.

FREE: Write today for a free estimate for rebuilding your equipment.

BOTWINIK BROS.
393 Welton St. New Haven 9, Conn.

POPULAR!

because it's
portable
practical
profitable

WELLS No. 8

CAPACITY
8" x 16" Rectangular
8" Diameter Round

Users like Wells Metal Cutting Band Saws for a number of very good reasons. In the first place these saws, though rugged in design and construction, are compact, self-contained, and readily portable. You can move them to a point most convenient to the work. They take up little floor space. Wells saws are also 100% practical—simple to operate, yet capable of handling a wide variety of work without special fixtures. A third important reason for widespread popularity, is that thousands of users have found them highly profitable. For a small investment, you get a versatile tool that can help you in many ways . . . in breaking bottlenecks . . . in getting work out in less time. See your local Wells distributor, or write for details.

Wells SAWS

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
2400 JACKSON AVE., THREE RIVERS, MICH.

CPA ORDERS IN EFFECT JANUARY 1, 1947

The Office of Temporary Controls, Washington, advises that the following Civilian Production Administration orders were in effect January 1, 1947. (Orders marked * were modified last on date indicated)

Chemicals Division

M-54 Restricts Delivery, use and consumption of molasses.

M-131 Provides for allocation of cinchona bark and cinchona aklaloids.

M-300 (Chemicals and Allied Products.)

Schedule 119 controls distribution of streptomycin.

Schedule 120 provides for allocation of potash.

Schedule 121 Phenolic resin.

Construction

*VHP-1 Veterans' Housing Program, general restriction on construction and repairs. (December 23, 1946).

VHP-2 General restrictions on hardwood lumber.

VHP-3 Use restrictions on cast iron soil pipe.

VHP-4 Production restrictions on cast iron soil pipe.

Equipment Division

L-352 Places quotas on exports of automobiles and trucks.

*L-356 Places quotas on exports of farm and track-laying type tractors. (December 27, 1946).

Forest Products Division

L-358 Permits builders of conventional-type houses to use up to 600 instead of 300 feet of softwood plywood per house.

*L-359 Limits sales of, and establishes set-asides for, various types of lumber. (December 30, 1946).

Miscellaneous Minerals

M-285 Restricts sales, purchases and deliveries of uranium and uranium compounds.

Production Scheduling

M-293 Regulates placing and acceptance of orders for specified products and restricts their production and delivery.

Rubber Division

*R-1 Controls sale and distribution of all natural and synthetic rubber except neoprene and establishes products specifications. Appendix I Establishes permitted uses and products. Appendix II Manufacturing regulations. (December 31, 1946).

Imports Division

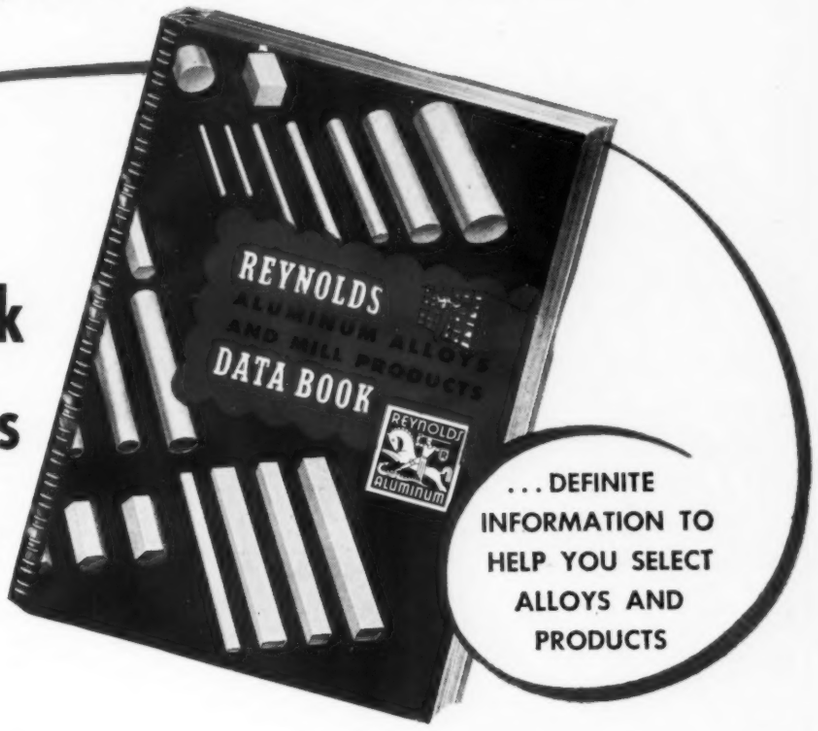
M-63 Establishes list of materials which cannot be imported except with permission of CPA.

Steel Branch

*M-21 Controls the production and distribution of iron products, steel forg-

(*Continued on page* 214)

Just off the Press...



New reference book on Aluminum Alloys and Mill Products

FOR design engineers, production men, and purchasing agents, this new reference book brings invaluable data on aluminum.

It contains 248 pages, 106 tables, 20 photographs, chock-full of specific facts about Aluminum Alloys and Aluminum Mill Products.

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This reference book on aluminum is the latest of several authoritative handbooks about aluminum recently published by Reynolds. You will find them all immensely valuable.

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THESE flexible back, metal-cutting saws have teeth as hard and as tough as a hack saw blade. Made from electric furnace steel, and heat treated by the most experienced producers of metal-cutting band saw blades. Used widely in foundries and metal-working plants for cutting all types of ferrous and non-ferrous metals.

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The *narrow* band saw for all contour sawing, jig, and band saw machines. Made from the same steel as the famous MILFORD flexible back saws, but designed and heat treated for cutting irregular shapes, either internally or externally, in metal or plastics.

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THE HENRY G. THOMPSON & SON CO.
Saw Specialists Exclusively for Over 65 Years
NEW HAVEN 5, CONNECTICUT, U. S. A.

(*Continued from page* 212)
ings and other steel products and steel alloying products; explains identification of purchase orders. (December 20, 1946).

Textile Division

*M-84 Provides for allocation of all agave fiber (imported by the Reconstruction Finance Corporation) and that part of the manila fiber imports brought in by RFC. Limits use of spinnable manila fiber and yarn to making rope for specified end uses; limits use of agave fiber and yarn to certain twines, rope, and binder and baler twine. Limits processors' and importers' inventories of manila fiber. (December 23, 1946).

M-317 Cotton Textile Distribution. Parent order under which distribution of cotton fabrics and cotton sale yarn are partially controlled. Defines exports and requires statement of source of preference ratings.

*M-317A Provides set-asides by cotton mills of types of twills customarily used for men's suits. Limits quantities of various cotton fabrics subject to delivery on rated orders. (December 30, 1946).

M-328 Textiles, Clothing and Related Products. Provides for issuance of directions controlling production, fabrication, processing, or delivery of textiles, clothing, or related products.

M-391 Control over rayon fabrics used for linings in men's and boys' clothing by restriction on sale or delivery of twills and serges, 88 to 140 sley, with rayon wrap and rayon or cotton filling. Purchase orders must certify that these materials will be used only as linings for men's and boys' suits, overcoats, topcoats, or separate jackets or trousers and the fabrics may be sold only for those uses. Limits quantities of various rayon fabrics subject to delivery on rated orders.

Tin Lead and Zinc Branch

M-43 Prohibits use of tin in certain products; restricts use in specified products, restricts deliveries; allocates pig tin.

*M-81 Limits type of cans made of tinplate, terneplate of blackplate. (December 23, 1946).

M-112 Establishes allocation controls for antimony subject to specified exemptions, prohibits use in certain products.

WAA STATES PRIORITY OF SMALL BUSINESS IS STILL IN EFFECT

The priority of small business to purchase surplus property is still in effect, War Assets Administration announces in clarifying the status of the priority which had been in question since the first of the year.

The announcement was based on a letter from U. S. Attorney General Tom C. Clark, who stated in effect that the expiration on December 31 of the act creating the Smaller War Plants Corporation did not affect the function of purchasing surplus for small business by Reconstruction Finance Corporation.

Answering the question of whether

(*Continued on page* 216)

TRUMBULL (T) ELECTRIC

MULTIBREAKERS

When you install a Trumbull Multibreaker you have assured Convenience, Economy and Reliability in modern circuit breaker protection for lighting circuits, small motors, appliances, water heaters, ranges and oil burners.

On overloads or short circuits, the Multibreaker automatically and instantly trips. On, Off and Tripped positions are indicated on the handle. To restore a tripped circuit merely move the handle from neutral position to Off . . . then to On. No fuses are needed. There's nothing to renew. No live parts are exposed even when restoring current.

Trumbull's complete line for residential use is shown below . . . and there's also a wide selection of industrial Multibreakers. See your Trumbull wholesaler for the capacities you need . . . make it Multibreaker for safe, durable protection . . . specify Trumbull for streamlined, compact design.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY
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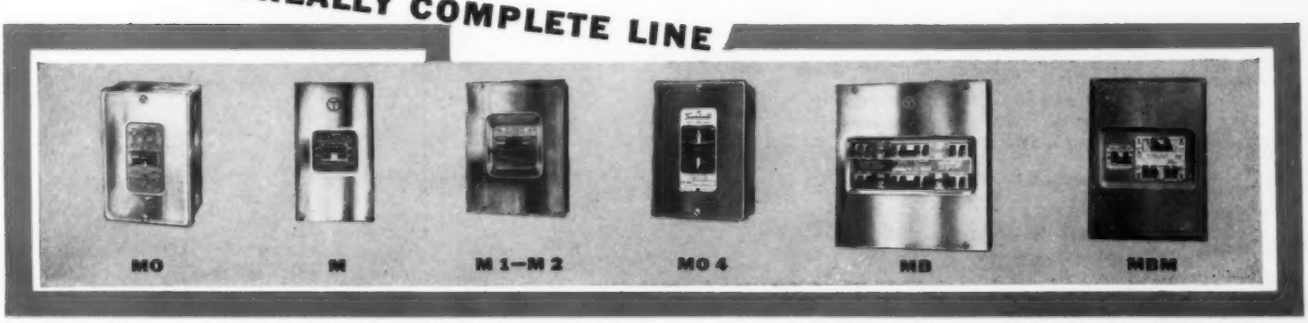
Other factories at Norwood, O.—Seattle, San Francisco, Los Angeles

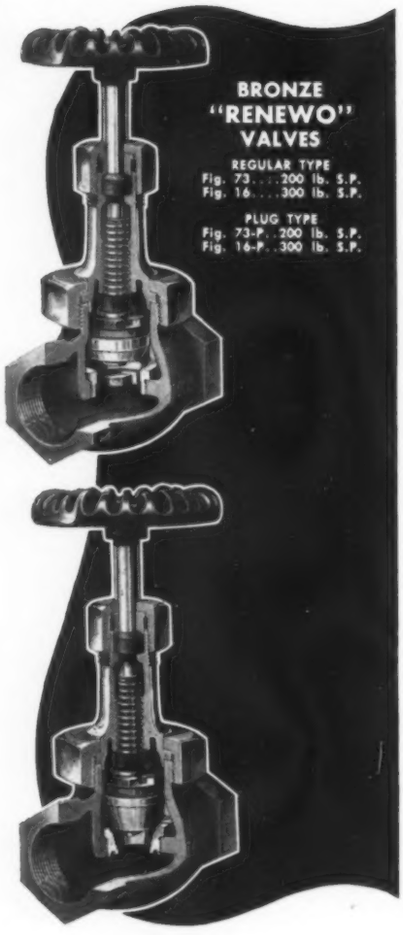
A REALLY COMPLETE LINE



BRONZE "RENEWO" VALVES

REGULAR TYPE
Fig. 73 . . . 200 lb. S.P.
Fig. 16 . . . 300 lb. S.P.

PLUG TYPE
Fig. 73-P . . 200 lb. S.P.
Fig. 16-P . . 300 lb. S.P.



Here's all you need...

to convert a regular type into a plug type valve...

SEATS AND DISCS INTERCHANGEABLE ★

Just insert a plug type seat and disc in place of the regular type, and you change an *entire* Bronze "Renewo" Valve from regular to plug type—providing all the extra advantages of this type, including its ability to stand up under hard service. No other change is necessary. The plug type seat-and-disc combination is made to *fit perfectly* into a regular type valve of corresponding size and pattern. And you have this same interchangeability in Iron Body "Ferrenewo" Valves. You don't have to buy an entire new valve . . . you don't even have to take the valve out of the line. *Lunkenheimer interchangeability goes still farther. *All parts* of 200 lb. "Renewo" and 150 lb. "Ferrenewo" Valves (except bodies and bonnet rings) are quickly, easily, perfectly interchangeable. Fewer parts are needed; ordering and handling are simplified; repairs are facilitated. You save time, labor, money.

Write for a copy of Circular 567—

IRON BODY "FERRENEWO" VALVES

REGULAR TYPE
Fig. 1021 . . . 150 lb. S.P.

PLUG TYPE
Fig. 1021-P . 150 lb. S.P.

LET YOUR LUNKENHEIMER DISTRIBUTOR DEMONSTRATE . .

Your nearby Lunkenheimer Distributor will welcome the opportunity to show you actual samples and demonstrate the interchangeability of parts in "RENEWO" and "FERRENEWO" Valves. You'll find it a big factor in increasing efficiency, lowering costs.

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EXPORT DEPARTMENT: 319-332 HUDSON ST., NEW YORK 13, N. Y.

(*Continued from page* 214)

"certain functions and duties relating to small business presently exercised by the Department of Commerce and RFC continue to exist," Atty. Gen. Clark stated:

"Although the Smaller War Plants Corporation expired, except for purposes of liquidation, on December 31, 1946, it is my view, after consideration of the applicable statutory provisions, that these functions and duties continue to exist as a matter of law beyond December 31, 1946, and may continue to be performed by the government agencies which now exercise them without the issuance of a further Executive Order."

The applicable law, Executive Order No. 9665, transferred these functions and duties in part to the Department of Commerce and in part to RFC on December 27, 1945.

★ ★ ★

SWEEPING AMENDMENT TO PR 28-CC RATINGS LIMITED

In a sweeping amendment to Priorities Regulation 28, the Civilian Production Administration of the Office of Temporary Controls sharply restricted the areas in which it will give assistance to business in obtaining materials and equipment, Commissioner John C. Houston, Jr., announced today.

The amendment is in line with the Administration's policy of decontrol whenever possible. Under the rewritten regulation, CPA will no longer grant CC priority ratings for production materials; maintenance, repair and operating supplies; capital equipment or construction materials or equipment for the purpose of starting or maintaining any individual plant or business or to alleviate individual hardship. Special rating assistance to small businessmen and veterans was terminated by revocation of Direction 20 of the Regulation.

In making this announcement, CPA made it clear that CC ratings already issued would continue valid, and that it would continue to issue ratings for non-deferable military needs, essential community needs, and to maintain or increase the production of veterans' housing materials or products, determined to be in critically short supply.

Specifically, CC ratings will be issued only in the following limited cases:

1. Where an item is needed to fill a military order which cannot be deferred without serious results to the defense program or to the health and welfare of enlisted personnel.

2. Where an item is needed to provide essential utility services or, in an emergency, to eliminate serious hazard to the life, health or safety of a large number of people.

3. Where material or equipment is required in connection with the Veterans' Emergency Housing Program to maintain or increase the production of a building material or product which has been determined to be in critically short supply.

In this connection several points were made clear. No ratings will be issued

(*Continued on page* 220)

HIGH Electro SPEED SNAGGING

With Electro High Speed Snagging Wheels you can get out of that tight spot between price allowance that crowds rough finishing costs too hard, and the hazard of next department or good customer dissatisfaction. Electro High Speed Snagging Wheels are savage in their attacks upon bars, billets, forgings and castings. Their brute strength holds them up under pressures and enables them to defy shocks that, ordinarily, would be shattering. They bite into stainless steel as confidently as into brass, and rough them down to the delight of every successive handler. Capital-letter SERVICE backs their built-in superiorities as to speed, safety and cutting qualities. It can start with the help of near-at-hand specialists to recommend types and techniques, and carry through after deliveries from stocks in Buffalo or Los Angeles. A field man will show you how to gain five ways by switching to Electro Grinding Wheels.

LOOK FOR THE GREEN BAND

When you tell us to have a Service Specialist call, tell us to send you a free copy of our new grinding wheel manual, the most talked of catalog in industry. It is illustrated in full color from operating photographs. It is technically complete.

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IC-330

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ask your local Crucible branch

1 **Tool Steel for the Non-Metallurgist**—A 32-page book for the non-metallurgist on the different types of tool steels, explaining the purposes for which each is best adapted and giving suggestions for heat treatment. 5½" x 7½".

2 **Warehouse Stock Book**—Lists the full range of steels . . . high speed, tool, die, stainless, alloy, machinery, and special purpose . . . ready for prompt delivery from the stocks of the 26 conveniently located Crucible warehouses. Contains descriptions, applications, heat treating, and working instructions, together with many useful tables. 160 pages, 5½" x 8¾".

3 **Rex High Speed Tool Bits**—An 8-page folder giving the characteristics and applications of the Rex line of high speed tool bits, with useful suggestions on tool bit grinding and a list of available stock sizes.

4 **Characteristics of Rezistal Stainless Steels**—Folded tabulation, opens up to 8¾" x 31¾", listing grades, analyses, type numbers, properties, heat treatment, and instructions for forging, cold working, drawing, machining, and welding Crucible's Rezistal stainless steels.

5 **Max-el Machinery Steels**—A 12-page folder containing chemical and physical data with stock information on Max-el machinery steels, including typical applications.

6 **Rexalloy Cast Non-Ferrous Cutting Alloy**—An 8-page folder on Rexalloy tipped tools and tool bits for applications between high speed steels and tungsten carbides. Gives range of speeds and feeds on various materials, lists bit sizes available, and explains economies possible with increased efficiencies.

7 **Steel Analyses**—Handy, washable wall chart, listing analyses of most generally used high speed, tool, stainless, alloy, machinery, and special purpose steels. Twelve pages, 8½" x 11", visible index.

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HIGH SPEED • HOT WORK • DIE CASTING DIES
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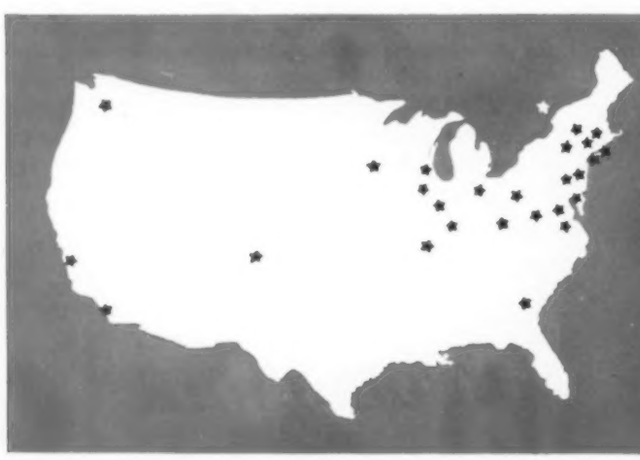

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STEELS

Each data sheet gives complete information on analysis, applications, critical temperature, forging, annealing, hardening, tempering and hardness, together with TTT curves where pertinent. Binder and tabbed manila separate sheets for each section will be supplied on request. Send for data sheets on all types of steels you use. Sheet size is 8½" x 11".

Write or ask your nearest Crucible branch office and warehouse today for any or all of the items in this valuable metalworking library. Your choice of this literature is yours for the asking to help you in the selection, treatment, and use of Crucible's

High Speed . Tool . Die . Stainless . Alloy Machinery . Special Purpose Steels

All of this steel . . . a full range . . . is made by Crucible. It is of uniformly high quality . . . the result of years of successful experience in producing specialty steels to meet exacting standards of materials and workmanship.

Got a problem? Call Crucible!

Crucible offers you the personal services of competent metallurgists, mechanical engineers, and other experienced men to help you solve problems connected with the selection, working, and heat treatment of specialty steels. These services are rendered without charge or obligation, whether or not you are a customer. Just call or write your nearest Crucible branch office and warehouse, listed at the left, and tell them what you're up against.

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Each of Crucible's 26 branch offices and warehouses carries complete stocks of all sizes and grades of specialty steels normally used in its territory. Your orders get prompt attention. Deliveries are equally prompt. Consider your Crucible warehouse as your main stockroom for the full range of specialty steels, thus reducing your inventories and simplifying and centralizing your buying.

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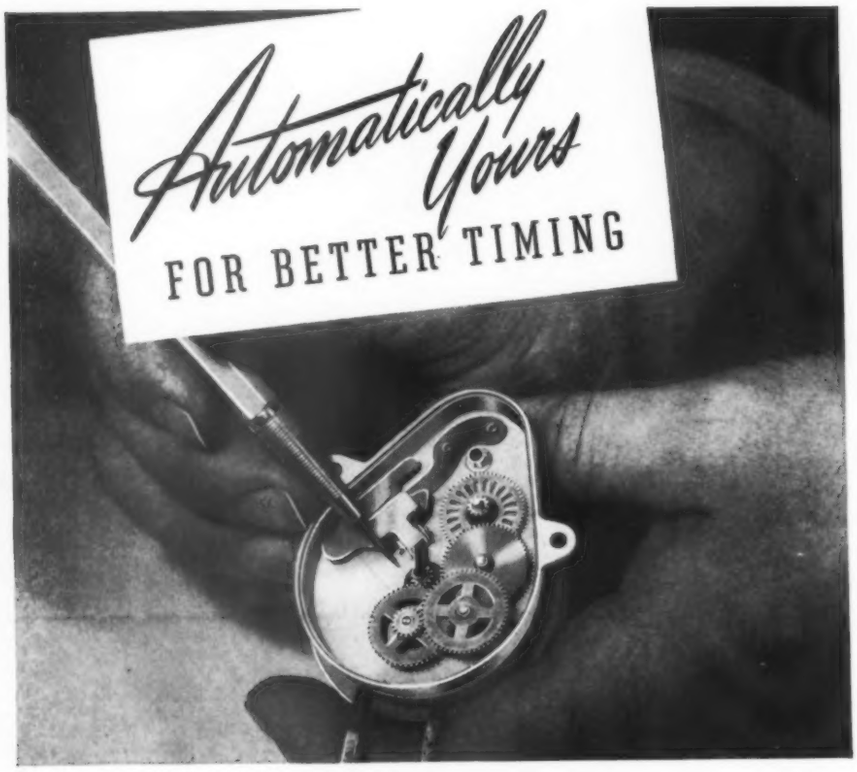
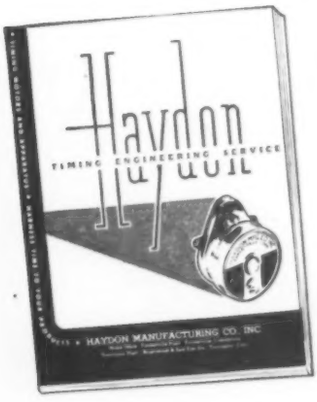
2 . . .
3 . . .
4 . . .
5 . . .
6 . . .
7 . . .
8 . . .



HAYDON Automatic Reset

For applications such as time delay relays, where automatic re-setting is required, HAYDON engineers have built into the #1600 series gear unit a magnetically operated counterbalanced gear shift. This automatically engages and disengages the gear train when the motor field is energized and de-energized. The drive shaft is then reset back to starting position by an external spring. It gives uniform engaging and disengaging action, irrespective of the mounting position of the motor.

- This construction is available in speeds from 15 RPM down to one revolution in 10 minutes.



Write for the new HAYDON catalog for detailed description of this and other HAYDON timers.

TIMING ENGINEERING SERVICE
Haydon
MANUFACTURING COMPANY
INCORPORATED
Forestville, Connecticut
SUBSIDIARY OF GENERAL TIME INSTRUMENTS CORPORATION

(Continued from page 216)

for the purchase of specialized machinery, such as that used in the manufacture of cement blocks. It was also stressed that rating assistance for items to be incorporated in non-housing construction will no longer be given, this being consistent with the decision to discontinue issuance of HH ratings for items to be used in housing.

Schedule 1 to PR-28 was also revoked. This schedule listed certain critically short materials, the producers of which were entitled to apply for special assistance.

Priorities Regulation 28A, under which special assistance was formerly given for textile yarn and fabric, was also revoked. Assistance in getting these materials will now only be granted under the limited conditions of PR-28 as amended.

At the same time, Direction 6, Directions 13 through 17 and Directions 19, 21, 23 and 24 were revoked as they are now superseded by the regulation as amended.

Provisions for the limited priority assistance for exports required for reasons of public policy or for the development of foreign sources of supplies vitally needed in this country remain unchanged.

PR-28 was devised to assist in eliminating production bottleneck and to help small business and returning veterans who needed such aid in starting in business during the industrial reconversion period. It was first instituted by the War Production Board July 3, 1945. It was set up by the predecessor agency to CPA to replace the necessarily complicated wartime priorities system and to enable WPB and, later, CPA to help business in general to reconvert to peacetime operations as swiftly as possible. It has been known as the "bottleneck breaker," since one of its chief functions was to help a business or industry, stymied by some particular shortage, to get the priority assistance necessary to clear the path to economically efficient operation.

MACHINE TOOLS LEAD SURPLUS PROPERTY OFFERINGS

Surplus property originally costing nearly a billion dollars is currently on sale over the nation, War Assets Administration reported recently.

The surplus, divided into 24 commodity groups and unclassified property, is offered at 623 sales including regional, national and location sales. It has an original cost of $999,712,000.

Offerings by the Detroit WAA Regional Office have the greatest value with $260,542,000 worth of surplus, including $192,521,000 in machine tools, on sale. Ten sales were scheduled by the Detroit office.

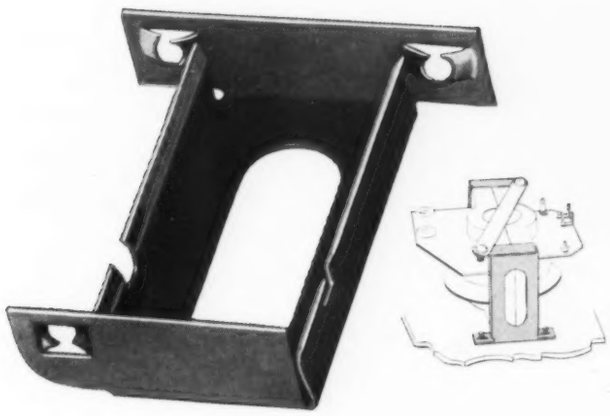
Next highest value is offered by Cincinnati which has $231,602,000 in surplus, including $189,490,000 in machine tools, offered at 30 sales.

San Francisco has scheduled the great-

(Continued on page 222)

This is a SPEED NUT*.....

and



THIS is also a Speed Nut*!

Of course you recognize the Standard SPEED NUT shown above, but just look at the "nightmare" our development engineers dreamed up, to provide multiple fastening and operational functions in a single unit! It is used in the assembly and mounting of television transformers (see sketch) and you can readily understand its advantages over special mounting brackets and individual, hard-to-handle threaded nuts and lock washers.

In addition to the widely-used standard types of SPEED NUTS, hundreds more are *functionally* designed to combine assembly operations, eliminate unnecessary handling of parts, speed-up production and thereby reduce final costs. They are fabricated on specially designed, automatic machines which produce *completely finished* parts at high speeds.

There must be some step in the assembly of your product where, by changing over to SPEED NUTS, your costs could be reduced and your product improved. Why not send us your assembly details, or better still, send in the parts involved. We will be glad to give you a complete fastening analysis . . . at no cost.

TINNERMAN PRODUCTS, INC.
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In Canada: Wallace Barnes Co., Ltd., Hamilton, Ont.
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Speed Nuts*
PATENTED
MORE THAN 4000 SHAPES AND SIZES

* Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

FIVE-FINGER FREEDOM...

with JOMAC industrial gloves!

FIVE-FINGER FREEDOM . . . the kind that gives you a sure, firm grip . . . plus *longer-wearing* protection . . . is built into every JOMAC Industrial Glove! No more fumbling . . . no more dropping heavy objects for lack of a firm grip. With JOMAC, you've got finger-tip control, as flexible as the hand itself.

And there is scientific reason for JOMAC's longer-wearing qualities . . . for its *better,* never-failing protection. JOMAC's extraordinary fabric is thick with hundreds of protective "cushions" . . . air-cells held in place by a hidden lock-stitch . . . giving up to *7 times* the wear of ordinary work-gloves!

JOMAC Industrial Gloves . . . built for longer wear *and* better protection . . . will work hand-in-hand with you toward increased production and lower operating-costs. Get the full story today. Write C. Walker Jones Co., 6130 N. Lambert St., Philadelphia 38, Pa. Plants in Philadelphia, Pa.; Warsaw, Ind.; Detroit, Mich. *Foreign Representatives:* Gillespie & Co. of New York, Inc., 96 Wall Street, New York 5, N. Y.

"SHAKE HANDS WITH SAFETY"

JOMAC INDUSTRIAL GLOVES

Try JOMAC'S "Pencil-Pick-up Test"!
You'll NOTE the difference!

(*Continued from page* 220)

est number of sales with 69; New York is second with 54 and Kansas City third with 51.

The report is based on sales programs for commodities having at least an original cost of $50,000. However, because many sales include offerings in more than one major commodity group, values for individual commodity groups are in some cases less than $50,000.

Among the commodity groups, machine tools originally costing $544,334,000 have top value with special industry equipment, costing $77,454,000, in second place.

CPA INDICATES MAINTENANCE OF TIN CONTROLS

Pointing out that United States imports of tin from the Far East during the first nine months of 1946 amounted to 2,474 tons, only about 5 per cent of the pre-war average, the Civilian Production Administration indicated recently that distribution controls on the metal should be maintained until imports from this source brought supply more closely in relation to demand.

In pre-war days, the Orient accounted for almost 75 per cent of tin output, CPA said.

Lack of skilled labor, equipment and consumer goods accounted for its small output in the first three quarters of last year, the agency said, indicating that production would be slow in returning to normal.

In a report on the U. S. tin position covering this nine month-period, CPA disclosed that tin imports from all sources amounted to 38,512 tons compared with 32,022 tons during the same period in 1945. Bolivia continued its war-attained position as the principal source of U. S. supply.

Total 1946 and 1947 tin supplies will be bolstered by a "windfall" of 10,000 tons of tin from Japan, of which 5,316 tons have already arrived here. The report said that this tin from Japan—after weighing, sorting and analysis—will be distributed among all countries represented on the Combined Tin Committee.

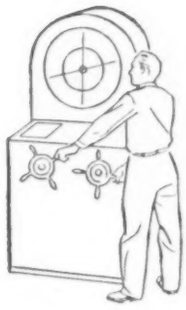
Tin consumption in the United States, according to the report, dropped to 59,005 tons compared with 66,564 tons in the similar 1945 period. This decline largely reflected work stoppages in the steel and automobile industries early in 1946, together with cancellation of war contracts.

Despite this drop in 1946 demand, imports of 38,512 tons and secondary tin recoveries of 17,861 tons were insufficient to meet the demand and government stocks were depleted by 5,394 tons.

Stocks of pig tin and tin concentrates held by the Office of Metals Reserve, Reconstruction Finance Corporation, dropped to 62,632 tons on October 1, 1946, from 68,026 tons at the beginning of the year. Both figures include 12,140 tons of Treasury and Navy reserve stocks not available for allocation to private industry.

Industry stocks of tin and concentrates were relatively stable during the period—amounting to 23,597 tons on January 1, 1946, and 23,698 on October 1, 1946.

Robin Hood would have loved these...



Arrows whose shafts are made from steel tubes! Matched in weight to within two grains, matched for 'spine' or stiffness to within thousandths of an inch—straight as a sunbeam—these steel-tube-shafted arrows are perfection in archery. Globe Steel tubes Co. doesn't make these arrows—but we do make steel tubes of such exceptional structural and metallurgical uniformity and quality they might readily be used for arrow shafts.

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Among the ASSOCIATIONS

Denounce Escalator Clauses

Government Advisory Group Declares Clauses Make Purchase Program That Will Meet Needs And Stay Within Budget Practically Impossible

A strong denunciation of the use of escalator clauses in government contracts was issued recently by the Advisory Committee on Procurement Policy, Washington, D. C.

The Committee, staffed by representatives of the major purchasing agencies of government, said in a resolution made public today that escalator clauses forced the Government to assume "more than its due share of the uncertain price responsibility" in many cases, and that such clauses made "exceedingly difficult or practically impossible, the planning of a purchase program which will fulfill needs and yet stay within a carefully designed budget."

The Committee is headed by Clifton E. Mack, Director of Procurement, and includes representatives of the armed services, thirty-four other Federal agencies and the D. C. Board of Commissioners.

The resolution follows:

"A remaining evil of contracting procedure born under the pressure of war—and which still remains in use to an entirely unnecessary degree—is the so-called "escalator" clause.

"It may be said that this type of clause, in its various forms, contributed valuably during occasions of emergency, when production overshadowed the element of price. However, because of its definite inflationary tendencies, the time is at hand to exclude, in every case possible, the use of this device in the contracting function.

"For the purposes of this resolution, and upon the collective authority of the many governmental groups having had experience with escalator clauses, they may be defined thus:

"Escalation" is a generic name for contractural devices whereby contract prices are changed in the event of certain contingencies, according to a predetermined base and predetermined method which are set forth in the contract. Among bases for escalation are changes in costs of material, changes in costs of labor, changes in published and provable price lists, changes in governmentally-fixed ceiling prices, and the like. Among methods of escalation are those based upon accounting analysis, upon automatically operating formulae, and upon negotiation.

"Of the many objections by the purchasor, to escalator clauses, the following may be cited as the most extreme:

"1. Escalator clauses have tended to place an undue burden upon the purchasor. They have been requested by suppliers in some cases wherein orders are filled from *existing stocks* and where the purchasor thus assumes more than his due share of the uncertain price responsibility in replenishing the vendor's inventories. This is a legitimate business risk which the vendor himself should assume, and is in no wise connected with the purchase at hand.

"2. To the purchasor operating within strict budgetary limits, the use of an escalator clause makes exceedingly difficult, or practically impossible, the planning on his part of a purchase program which will fulfill his entire needs and yet stay within a carefully designed budget.

"3. Escalator clauses are entirely unnecessary and uncalled for in cases involving commodities, the price of which shall be the "posted" or "going" price, published at the time of delivery.

"Only for the sake of brevity are other equally valid reasons for the elimination of escalator clauses excluded. The return to a sound peacetime method of business operation is afflicted with many problems, of which we consider the use of escalator clauses to be one. Their elimination will speed the universally desired return to "normal" business practices to an appreciable degree.

"A further step toward eliminating the need for such clauses can be taken by strict adherence to the President's letter of August 1, advocating a limitation of purchases to meet only immediate and urgent requirements.

"Be it therefore resolved that:

"The Advisory Committee on Procurement Policy strongly opposes the use of escalator clauses and urges their elimination in all cases possible."

Mr. Mack, commenting on the results of the Committee's action, advises that he is particularly gratified to see that a substantial portion of industry, together with the purchasing profession itself, began more vigorous public utterances on the subject immediately after the issuance of the Advisory Committee's statement.

"We do not, of course, presume that our action was entirely responsible for this developing solid front against escalation", he states. "Our chief cause for gratification lies within the fact that we

(*Continued on page 226*)

LARGE ENROLLMENT FOR MLWAUKEE PURCHASING CLASS

Joseph W. Nicholson, Purchasing Agent, City of Milwaukee, recently released the following report on the class in industrial purchasing sponsored by the Purchasing Agents Association of Milwaukee, in cooperation with Marquette University of that city. Mr. Nicholson is one of the instructors.

The Milwaukee Association of Purchasing Agents is now completing its eleventh year of sponsorship of an educational course in purchasing. Marquette University has cooperated with the Association in supplying all the necessary facilities including the supervision of a qualified faculty member in order that the course may meet scholastic requirements, as it is a credit course. It runs every Thursday evening for two hours and for two semesters each year so that four semester hours college credit can be obtained in this manner. This year there are 75 students, but in normal times the class membership usually runs between thirty and forty. The large attendance this year is due mainly to the operation of the G. I. Bill of Rights of which so many veterans have taken advantage. The Educational Committee of the Milwaukee Association of Purchasing Agents provides the instructor and visiting lecturers.

The first semester of each year covers fundamentals of purchasing. The Lewis Book "Industrial Purchasing" is a required textbook and every chapter is thoroughly covered by the end of the first semester. This is accomplished by means of explanatory lectures given by the visiting members of the Association covering specific phases of purchasing and by the work of the instructor whose responsibility it is to see that all chapters are thoroughly covered.

Advanced Course

The second semester is an advanced course which includes the following types of instruction:

1. Problems. These problems are presented in the manner of the Dr. Lewis problem book and the students are required to solve them.

2. Sound films depicting industrial processes of manufacture, finishing, assembling, materials handling, etc.

3. Exhibits covering so far as possible materials depicted in sound films. Plastics, abrasives, drop forgings and other materials and processes are exhibited. On these evenings a lecturer from the particular industry in point is frequently on hand to explain exhibits and answer questions. One film and lecture of particular value was that covering the tempering and

(*Continued on page 226*)

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Modern battery-powered trucks will give you all the capacity you need plus safety, every-day dependability and freedom from maintenance. When all the costs are counted, battery power costs less! The 10% extra capacity, and longer life of Philco "Thirty" Storage Batteries have introduced a new era in low-cost handling. Write for latest catalog of specification data.

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A machine needs *guts to make a tumbler**

Wear-resistant Ampco Metal protects glass-making machines against production-interrupting breakdowns

*"The manufacture of glass containers requires more from a machine than any other automatic production process," according to engineers at the Hartford Empire Company, Hartford, Conn., leading producer of glass-making machinery. "Equipment must run 24 hours-a-day, month after month except for mold and job changes. Add high temperatures, constant vibration and stress . . . and you have the ever-present threat of a machine breakdown.

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AD-27A

DENOUNCE ESCALATOR CLAUSES

(*Continued from page 224*)

helped crystallize opinion and took what we consider to be a leading step, which is, after all, one of our most important assignments.

"The volume of government purchases at any time is substantial enough to warrant close attention to its procurement policies. These are for the most part made known to industry in general through the activities of the Advisory Committee, which now includes representatives of 34 federal agencies, the military services and the District of Columbia Commissioners. In deciding that the time was at hand for specific action against the unsound practice of continuing escalator clauses, the resolution of the committee was unanimously passed. All of use are happy to learn that industry and purchasing agents everywhere are in agreement with us."

MILWAUKEE PURCHASING CLASS

(*Continued from page 224*)

hardening of steel. This is a highly technical subject and an expert was present to explain the film.

In this manner the students are brought in close contact with actual products and processes covering items which they will be expected to buy or which they are now buying. It gives them knowledge of plant operation and an insight into the processes required to fabricate or produce an article which they very likely will purchase. I believe Confucius said "A picture is worth a thousand words". It has been my experience that the things our students have seen have made a lasting impression upon them. Some of the films are of such value that they have been shown at our regular monthly Association meetings.

Mr. Edward L. Block, Purchasing Agent, Unit Drop Forge Div. of the Fuller Mfg. Co. is President of the Association and being a staunch supporter of the Educational course he attended the first meeting last fall and inspired the students by telling them about the work of the Association.

"PURCHASING PERSONNEL" BUFFALO ASSOCIATION

The Purchasing Agents Association of Buffalo met on January 13th at the Hotel Statler, Buffalo, N. Y. A director's meeting was held at 5:30 p.m., followed by the regular dinner at 6:30 p.m.

Events of the evening included an "Educational Meeting", led by E. W. Noble, chairman, and William E. Blake. Following this Stanley W. Mackenzie, Director of Purchases, U. S. Rubber Company, delivered an address on the subject of "Purchasing Personnel". A discussion was held on the topics of "Measuring the Efficiency of a Purchasing Dept.", "Determining the Purchasing Qualifications of a Purchasing Agent", and "Evaluation of Purchasing Personnel." Carl Zerk was the discussion leader.

(*Please turn to page 230*)

GEORG SIMON OHM, 1787-1854—Ohm's Law (I = E/R), the fundamental basis of all direct current calculations, was first demonstrated mathematically by Dr. Georg Simon Ohm in 1827 after ten years of study and research. His extremely simple statement of a great electrical truth ranks in importance with the laws of gravitation.

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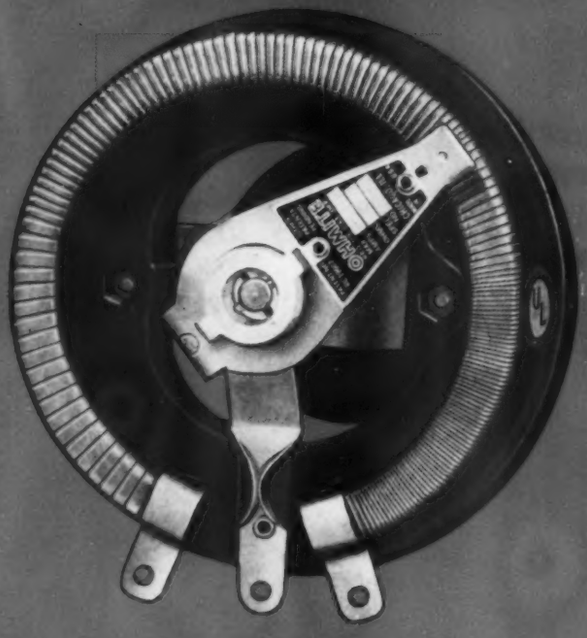

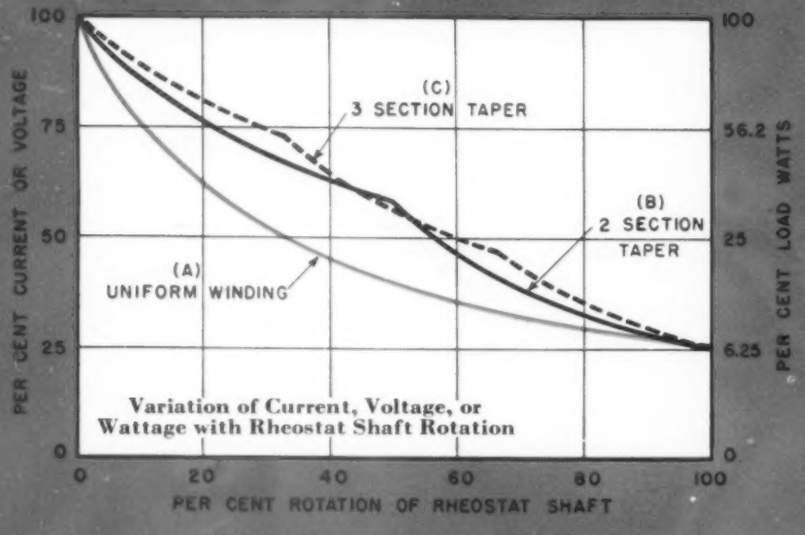

Variation of Current, Voltage, or Wattage with Rheostat Shaft Rotation

HOW A TAPERED WINDING PROVIDES MORE UNIFORM CONTROL

In a uniformly wound rheostat, each degree of rotation adds a constant number of ohms to a constantly increasing number of ohms. Hence, as the rheostat shaft is rotated, the resistance increases more slowly and the current decreases more slowly than before, as shown in Curve A of the chart above. A tapered winding (Curves B and C), by increasing the number of ohms per degree of rotation as the total ohms in the circuit increase, makes the rotation versus current curve more nearly linear.

Rheostat windings are sometimes tapered—that is, wound in two or more sections of diminishing wire sizes. This can be done because only the first turn of a rheostat carries the maximum current. Succeeding turns carry only a fraction of the maximum current. Thus, they can be of smaller wire size, permitting the use of a smaller rheostat—or a winding of higher resistance for a given size rheostat. Ohmite will design special tapered windings to suit individual needs. An extensive line of standard tapered rheostats is also available.

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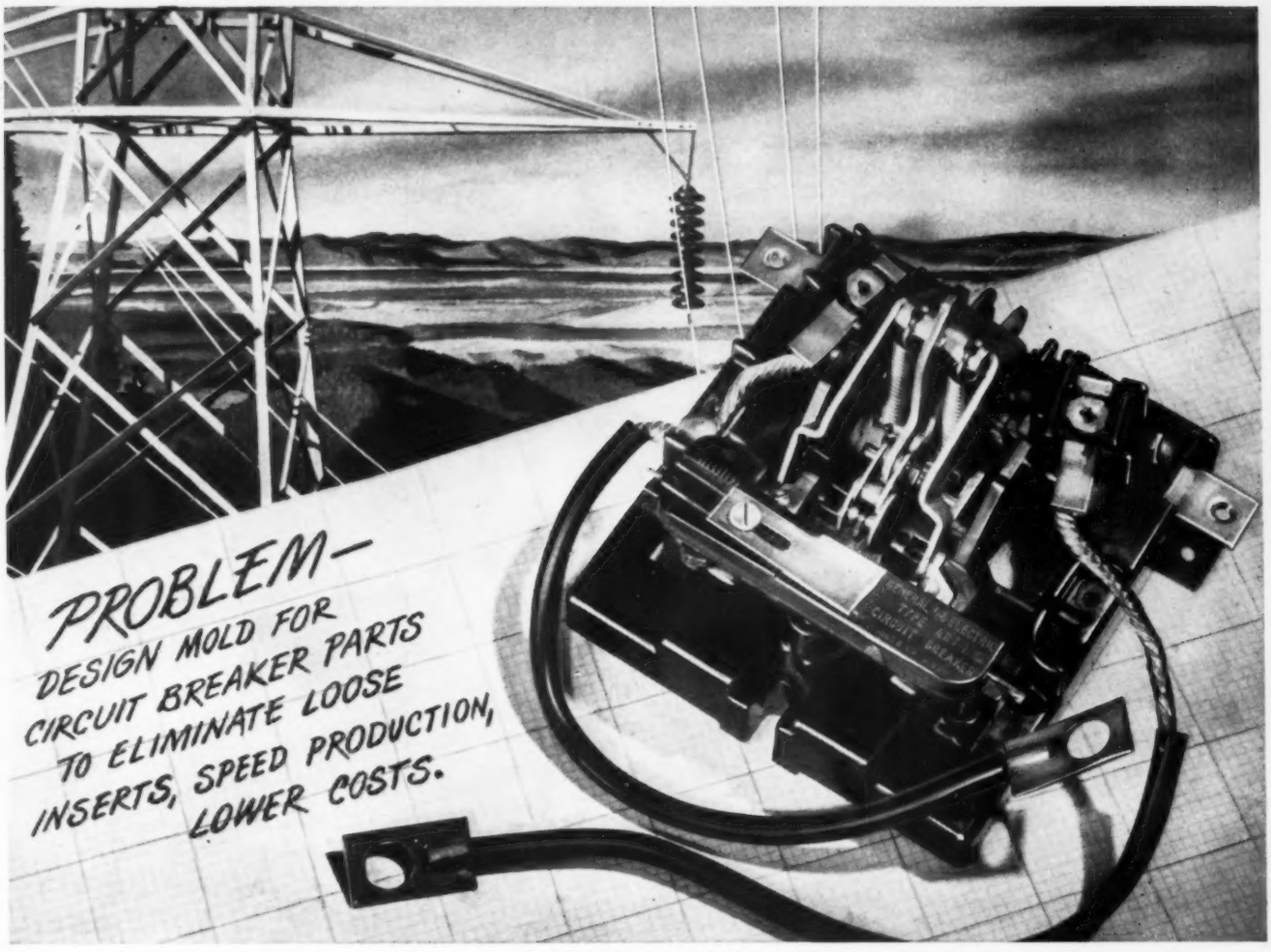

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STOCK MARKET DISCUSSED DAYTON ASSOCIATION

Walter C. Barnes, auditor of Moraine Products, teacher of accounting and economics, was the guest speaker at the December meeting of the Purchasing Agents Association of Dayton, Ohio. Mr. Barnes' talk included a lesson in psychology as a basis for his stock market discussion. He stated that the stock market was a barometer based on action of the subconscious mind. He mentioned three "fear stimulators" that have been present and are now clearing. These are; Politics—now out of the way or on the way out; Labor—the present fear stimulator; and Railroads—recent authorized increases take them out of the fear group. He further stated that there is still one more wave of heavy pessimism to come, brought on by the labor situation, after which the long upward cycle interrupted by the war, will be resumed. This resumption, he stated, will start about March. He also brought attention to some of the price reductions already made and the trend toward a more balanced condition.

Economist, Dr. Henry Hodges whose talk is a regular monthly feature, presented some comments and predictions along the economic front. He reviewed the rubber situation, stating that there would be plenty of natural rubber for industry's needs in 1947, with inventories being built up by both government and industries. He also discussed building materials and construction with the prediction that building controls would be cleared up considerably, limits on non-veteran housing would be eliminated and subsidies on building materials would be discontinued. He pointed out the possibilities in the use of 37,000 enemy patents being made available by the government.

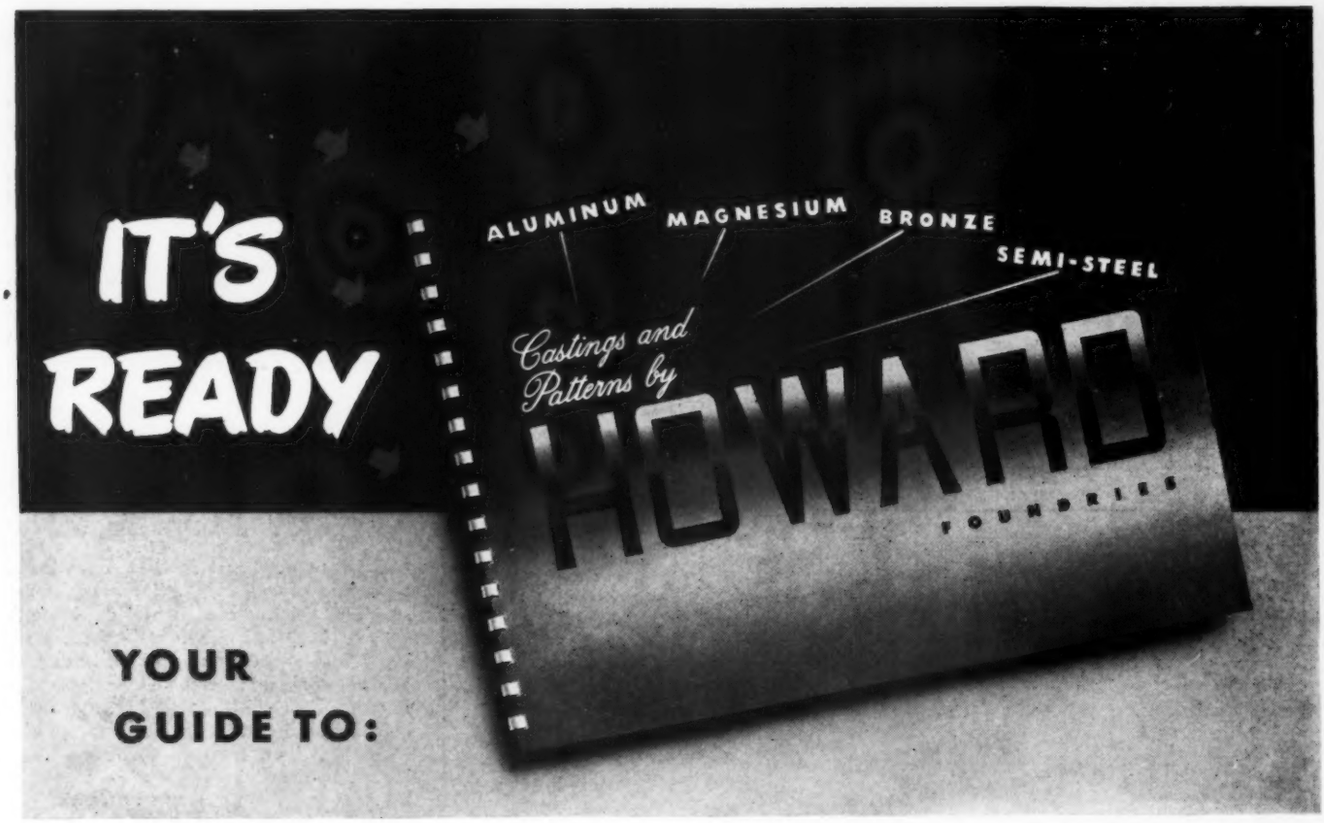
Harold Wright, Standard Radio & Electronic Products Co., was welcomed into the association as a new member. It was also announced that as a result of popular demand the association plans to sponsor a series of Forum Discussion meetings.

CONNECTICUT ASSN. ATTENDS PLAY MATINEE

Sixty-seven members of the Purchasing Agents Association of Connecticut and their wives or lady friends attended a matinee performance of "The Voice of The Turtle" at the Schubert Theater in New Haven in December.

After the play they went to the Hotel Taft Ballroom for dinner and dancing. The ladies were each presented with a corsage and a gift. Retiring president W. J. Roemer was presented with a souvenir wrist watch by W. A. Towle, president-elect, on behalf of the association. The new 1947 officers were present and Mr. Roemer gave a farewell address, thanking all the officers and members of the association for their splendid cooperation in making his administration so successful.

(Please turn to page 232)



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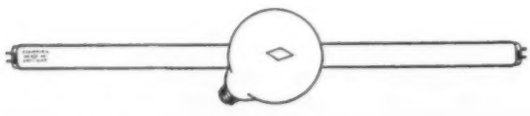

CHAMPION LAMP WORKS

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ESCALATOR CLAUSES DISCUSSED WASHINGTON ASSOCIATION

Industrial, commercial and governmental purchasing men from various points in Western Washington met on January 9th at the Washington Athletic Club in Seattle for the monthly dinner meeting of the Purchasing Agents Association of Washington.

An educational forum at 4:30 p.m. preceded the dinner meeting. The topic was "The Legal Phases of Purchasing" and Harold D. Mitchell, Purchasing Agent, Housing Authority of King County, and chairman of the educational committee, presided. Following the general discussion Burton J. Wheelon, attorney, spoke on matters connected with the evening's topic.

The dinner meeting was presided over by President R. Guy Frederick. Discussion's Chairman, Ralph Bryant, Purchasing Agent, Seattle Lighting & Fixture Co., and John Richter, Purchasing Agent, Preservative Paint Co., led the discussion on "Eliminating Escalator Clauses".

"The 1947 Outlook for Football, Basketball and Baseball at the University of Washington" was presented by Art McLarney, Baseball Coach and Asst. Basketball and Football Coach, and Johnny Cherberg, Asst. Football Coach. Following this some movie shots of the 1946 St. Mary's vs University of Washington football game were shown.

PAST PRESIDENT'S NIGHT AT EASTERN NEW YORK ASSOCIATION

The January 16th meeting of the Purchasing Agents Association of Eastern New York, held at the Canary Room, De Witt Clinton Hotel, Albany, New York, was designated Annual Past President's Night.

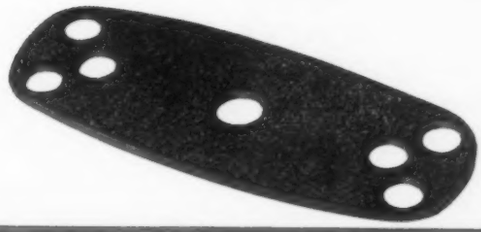
The meeting was presided over by a group of eight former association presidents, and the program, membership, publicity and commodity committees were likewise headed by past presidents. George L. Fuller, president 1941-42, delivered a report on Coal; James J. Elder, president 1928-29, spoke on Cotton; and Iron and Steel products were discussed by C. F. Straney, president 1938-39.

PAST PRESIDENTS' NIGHT MILWAUKEE ASSOCIATION

Rev. Thomas B. Lyter, of the Washington Park Presbyterian Church, was the speaker of the evening at the monthly meeting of the Milwaukee Association of Purchasing Agents, held January 14th at the Elks Club, Milwaukee, Wis.

The meeting was held in honor of the association's past presidents. Wives of members and of past presidents attended. Five new active members were approved by the Board of Directors. They are: F. O. Cole, Modern Equipment Co.; C. P. Eberhart, Blatz Brewing Co.; C. E. Krause, The Massey Harris Co.; J. F. Somerville, Moe Bros. Mfg. Co.; and V. M. Sperling, Fred G. Smith Bolt & Nut Co.

(*Please turn to page* 234)



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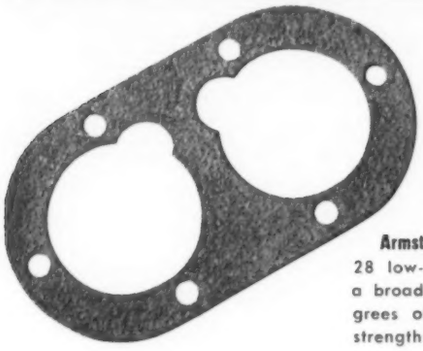

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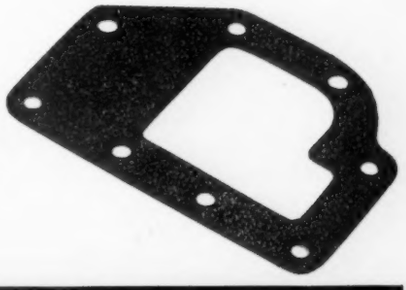

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BRITISH COLUMBIA ASSOCIATION DECEMBER ACTIVITIES

The Purchasing Agents Association of British Columbia highlighted the month of December with their annual Christmas dance at the Hotel Vancouver, Vancouver, B. C., at which 400 members, wives, and friends were present.

On December 20th the members of the association were guests of the Vancouver Board of Trade, Products Bureau. E. J. Malkin, Bureau chairman, drew attention to the difficulty in maintaining employment in the province now that war orders are no longer available, adding that the purchasing agents have an interest in building B. C. payrolls.

J. B. Watson, association president, stated that purchasing agents would like to see British Columbia manufacturers base their prices on their costs, not on laid down prices of Eastern Canadian and American firms. He urged that B. C. manufacturers do their utmost to hold on to the new market which has developed in the Province and emphasized that they give close attention to quality and price.

During the month a study group meeting was held at which the subject of escalator clauses on contracts and purchase orders was discussed. The Food Buyer's group, under the chairmanship of Mr. L. S. Carr also met to discuss various food buying problems.

NEW YEAR'S EVE PARTY NEW ORLEANS ASSOCIATION

The Purchasing Agents Association of New Orleans saw the old year out and the new year in at a New Year's Eve supper dance held December 31st at the Jung Roof, Jung Hotel, New Orleans, La. The party, which was for members and their guests only, began at 9:30 p.m. and lasted until after 2:00 a.m. Leslie Marks was vice-chairman and Theo Harvey, chairman of the entertainment committee.

"EFFICIENCY VS. PROFICIENCY IN PURCHASING"—ROCHESTER BUYERS

"Efficiency vs. Proficiency in Purchasing" was subject of discussion by Stuart F. Heinritz, editor of Purchasing Magazine, at meeting of the Rochester Association of Industrial Buyers, in the Normandie Hotel, Rochester, N. Y., January 8. Presiding officer was Harold W. Russell of Hawk Eye Works, Eastman Kodak Co., president of the association.

COMMODITY DISCUSSIONS SPRINGFIELD ASSOCIATION

Vice president Laihr presided over the January 8th meeting of the Springfield Branch of the N. A. P. A. at the Shawnee Hotel, Springfield, Ohio. Commodity discussions were held on food, agriculture, copper, cotton and steel. Seven new members were also nominated and elected to membership.

(*Please turn to page* 236)

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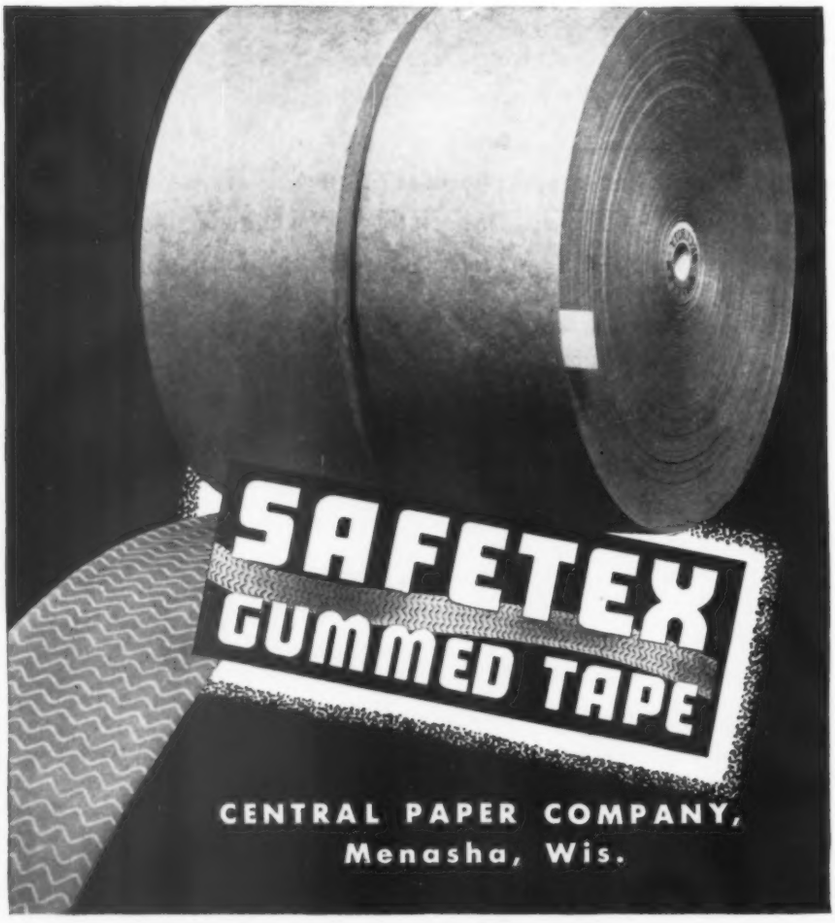

THIS BUSINESS OF PROCUREMENT NEW ENGLAND ASSOCIATION

Dr. Howard Thompson Lewis, Professor of Marketing, Harvard Graduate School of Business Administration, and Editor, "Harvard Business Review", was guest speaker at the January 13th meeting of the New England Purchasing Agents Association. The meeting was held at Schraffts, Boston, Mass., and was preceded by an afternoon conference beginning at 4:30 p.m. for a discussion of "The Purchasing Department as Related to This Year's Budgeting". Leo Collette, Davidson Rubber Co., was the chairman. Following the discussion brief commodity reports were made by the respective chairmen.

Dr. Lewis, who spoke before the group, has for many years been a leader among educators in recognizing and working for the advancement of the purchasing function to its rightful place in management. He is a holder of the Shipman Gold Medal, the highest honor the National Association of Purchasing Agents can bestow, and was lately commended by the New England District Council for preparing the booklets used in conducting purchasing forums for association members.

ANNUAL MEETING TWIN CITY ASSOCIATION

The annual meeting and election night of the Twin City Association of Purchasing Agents was held January 8 at the St. Paul Athletic Club, St. Paul, Minnesota.

Paul W. McCracken, director of research, Federal Reserve Bank, Minneapolis, well known economist in banking circles, was the guest speaker, presenting his prognostications for 1947.

WASHINGTON WOMEN'S GROUP NEW OFFICERS ELECTED

At the last meeting of the 1946 year, held in December at the Gowman Hotel Colonial Room, Seattle, Washington, the Women's Group of the Purchasing Agents Association of Washington welcomed their officers for 1947. The new officers installed include: President, Lucille Graham; Vice-president, Dorothy Brown; Secretary, Anita Jordan; and Treasurer, Evelyn Dunker.

LONDON-ST. THOMAS ASSOCIATION BEING ORGANIZED

As a result of the increased interest manifested by industries located in the area, the organization of a London-St. Thomas District Purchasing Agents Association is being undertaken by the Central Ontario Association, London, Ont. Canada. A temporary committee has been established to deal with the problems and details incurred in the formation of the new group.

(*Please turn to page* 238)

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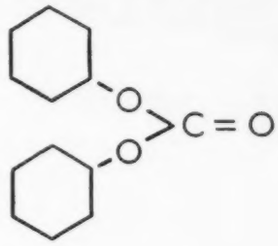
Structural Formula:



Physical Properties:

Appearance: white crystalline solid, white needles from alcohol.

Molecular Weight: 214.
Melting Point: 78° C.
Boiling Point: 302° C.
Specific Gravity:
Liquid 1.122 at 87° C.
Solid 1.272 at 14° C.

Chemical Properties:

1. Can be halogenated and nitrated in characteristic manner.

2. Readily undergoes hydrolysis and ammonolysis when treated respectively with inorganic bases, ammonia and amines.

Solubilities:

Insoluble in water.

Quite soluble in acetone, hot alcohol, benzene, carbon tetrachloride, ether, glacial acetic acid, and many other organic solvents.

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"HOW BUYERS BEHAVE IN A BUYERS' MARKET", N. E. SALES CONFERENCE

"How Buyers Behave in a Buyers' Market" was theme of address by Editor Stuart F. Heinritz of Purchasing Magazine, at the 8th annual New England Sales Management Conference, sponsored by the Boston Chamber of Conference, at the Statler Hotel, Boston, January 10 and 11. His address appears elsewhere in this issue: Organizations cooperating in the conference, were as follows:

American Management Assn.;
Advertising Federation of America,
American Marketing Assn.,
Associated Industries of Mass.,
Advertising Club of Boston,
Boston Sales Managers Club,
Boston Executives Club,
Boston Trade Assn. Executives,
Dept. of Commercial and Industrial Affairs,
Hartford Sales Managers Club,
Manufacturers Assn. of Connecticut,
New England Council,
National Federation of Sales Executives,
New England Assn. of Mfrs' Representatives,
New Haven Sales Managers Club,
Providence Sales Managers Club,
Sales Executive Club of New York,
Springfield Sales Managers Club,
Society for the Advancement of Management,
Smaller Business Assn. of New England,
Worcester Sales Executives Club.

LAWRENCE SMITH ELECTED PRESIDENT SAGINAW VALLEY ASSN.

Mr. Walter Jewel, Saginaw Branch, Pittsburgh Plate Glass Co., was guest speaker at the December meeting of the Saginaw Valley Purchasing Agents Association at the Wenonah Hotel, Bay City, Michigan. Mr. Jewel spoke on the origin, development and new characteristics of glass. Following his talk he answered questions posed by many of the members. The nominating committee presented a slate of officers for 1947 which was unanimously approved by all members present. The new officers include:

President—Lawrence Smith; Vice-president—Clark Cummins; Secretary—Ed Schrems; Treasurer—G. M. Behler; National director—W. C. Thompson.

Retiring president W. C. Thompson thanked the officers and members for their cooperation during his term of office and then turned the meeting over to president-elect Lawrence Smith.

AMARILLO AUTHOR ADDRESSES PANHANDLE ASSOCIATION

John McCarthy, author of Maverick Town, the story of old Tascosia, and assistant publisher of the Amarillo Globe News, was the principal speaker at the December meeting of the Purchasing Agents Association of the Texas Panhandle.

(*Please turn to page* 240)

MERRY CHRISTMAS

(1947 Style)

A lot of companies have already placed their Christmas container orders for the 1947 season. (Just a reminder — if you haven't — do it now.) Most of the orders placed show a decided preference for set-up boxes. In many cases, ordinary merchandise becomes a gift item, thanks to a box. There's a moral here, for your product can be a Christmas item all year round if packaged in a better selling set-up box. Consult your nearest National Paper Box Manufacturer* today and he will gladly show you the reasons why set-up boxes will better sell your products.

*Write today to Dept. 102, National Paper Box Manufacturers Association, Liberty Trust Building, Philadelphia 7, Pennsylvania, for container information vital to your industry.

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G. C. HEIDINGER ELECTED PRESIDENT TULSA ASSN.

At the annual meeting held December 10th the Purchasing Agents Association of Tulsa completed its 27th year of existence. The main feature of the annual meeting was the election of officers for 1947. The Tulsa association operates all its affairs on a calendar year basis rather than making changes prior to the summer adjournment period.

The nominating committee, composed of R. V. Stephens and H. E. Kaiser, both past presidents and F. A. Kirkland, a veteran member, presented a slate of officers which was subsequently approved. The 1947 officers include:

President—G. C. Heidinger, Stanolind Oil & Gas Co.

First vice-president—F. P. Nopper, Gulf Oil Corp.

Second vice-president—C. W. Wallace, Mid-Continent Pet. Corp.

Secretary-treasurer—J. C. Nicholson, Tretolite Company.

National director—K. G. Manning, The Texas Company.

H. M. Cosgrove, Tulsa Building, Tulsa, is executive secretary of the association, and E. R. Welch is assistant secretary.

The annual meeting was a closed meeting, and following the election of officers a motion picture on Nickel was shown.

The annual President's-Ladies night dinner and dance was held December 13th at the Tulsa Club. Approximately 200 members and guests were present. After dinner, and preceding the dance, retiring president K. G. Manning was presented with an engraved wrist watch as a tribute from the association. R. V. Stephens, president in 1945, made the presentation.

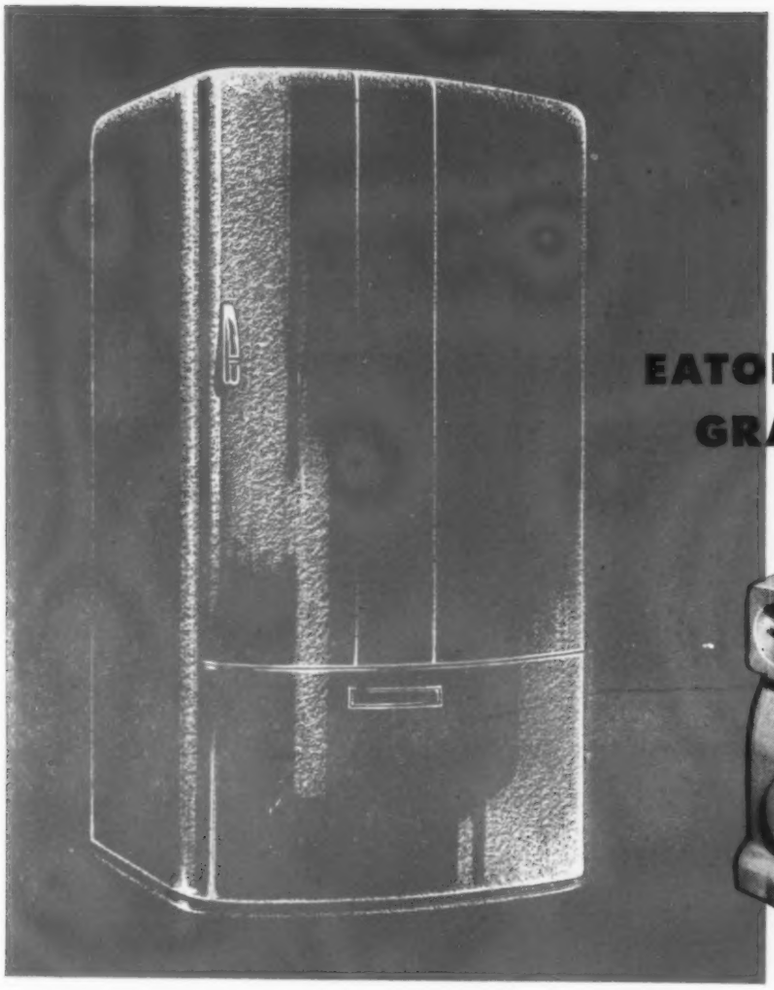
FIVE NEW MEMBERS WELCOMED NEW ORLEANS ASSOCIATION

Five new members were welcomed at the regular monthly meeting of the Purchasing Agents Association of New Orleans, which took place at the Jung Hotel, New Orleans, La., January 13th. These new members include: Robert Mertl, Transportation Equipment Co., Inc.; George Baudean, P. A. Sewage & Water Board; Thomas W. Born and W. W. Woodland, Freeport Sulphur Company; and H. Stanley, Mississippi Power & Light Company.

HEINRITZ ADDRESSES CONTROLLERS INSTITUTE, CLEVELAND

"Purchasing and Inventory Policies for 1947" was subject of address by Stuart F. Heinritz, editor of PURCHASING Magazine, New York, at meeting of the Controllers Institute, at the Cleveland Athletic Club, Cleveland, Ohio on January 14th. Presiding officer was R. L. Brummage, Controller of Dresser Industries, Inc.

(*Please turn to page* 244)



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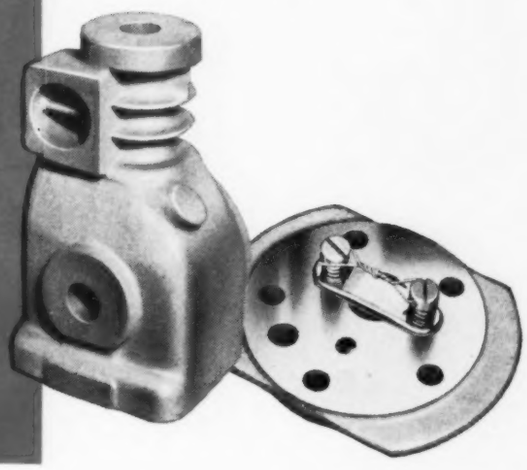

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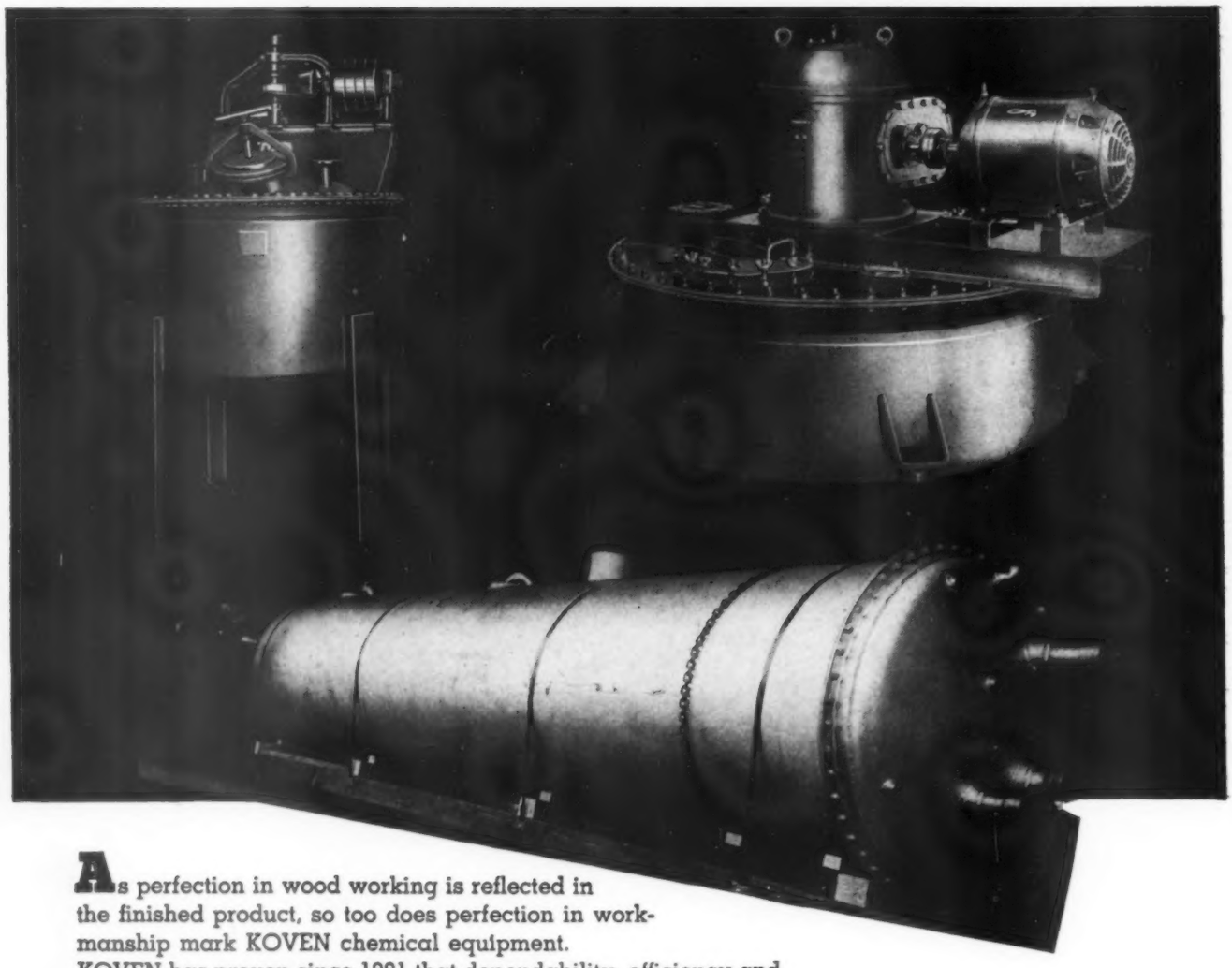

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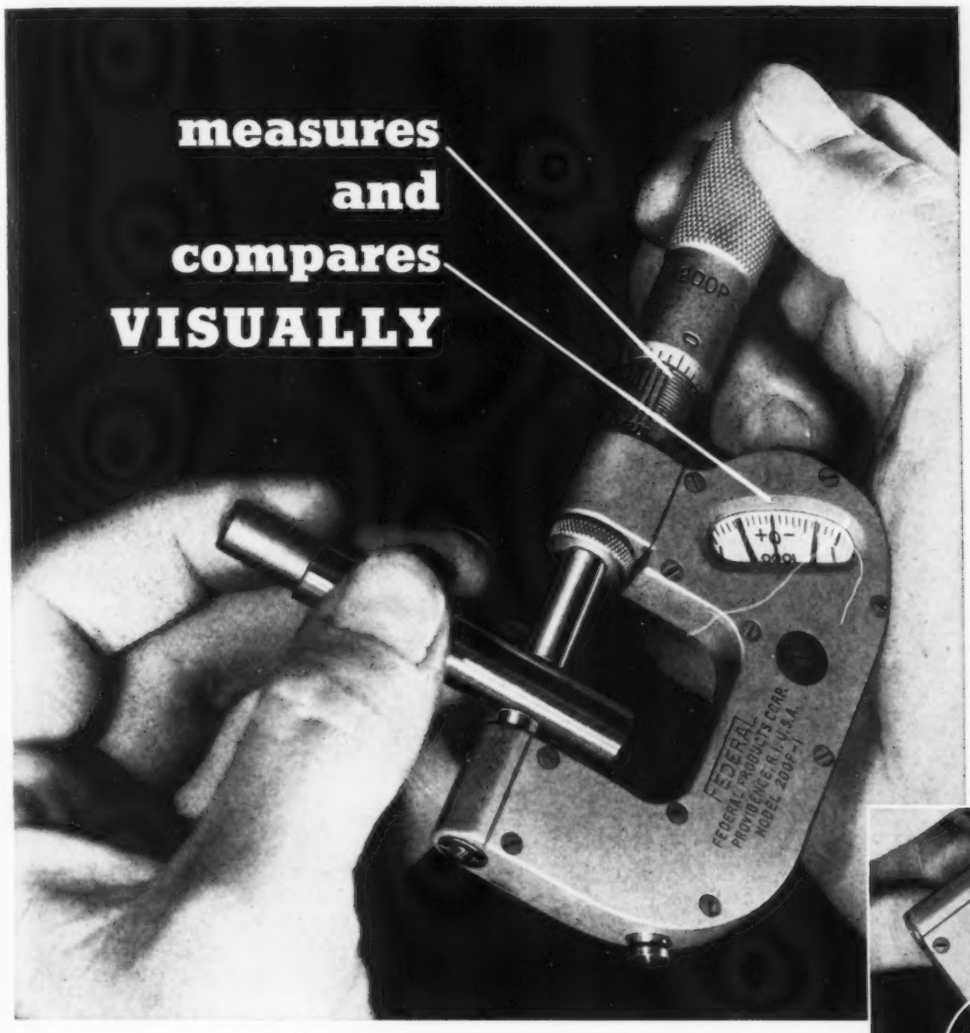

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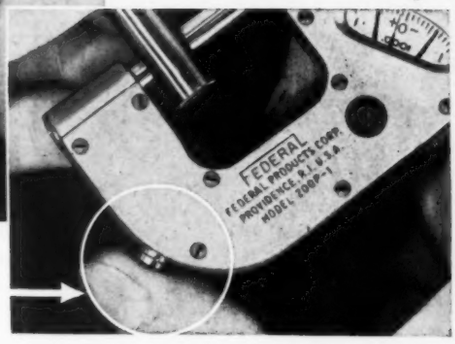

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CANTON ASSOCIATION HEARS ARMY OFFICER TALK

"Who Won the War and Who will win the Peace" was the subject of an address given by the former Lt. Colonel Ralph L. Wolf of Columbus, Ohio, at the December 18th meeting of the Purchasing Agents Association of Canton, at the Onesto Hotel, Canton, Ohio.

Colonel Wolf, who was a member of General Patton's staff during the European Campaign gave a brief description of the American Soldier to whom he gave a portion of the credit for the victory. It was his opinion that these men with like minded people should make known their desires on the subject of peace, and he said their united effort in this discussion would be just as fruitful as in the military way. He also related many instances accompanied by the colorful language used by the general to emphasize the manner in which he was able to carry on as the outstanding field general of the Allied armies.

Colonel Wolf pointed out that in his opinion all wars are political wars and that the science of politics is used to possibly a greater extent than the weight of arms. He discussed some little known details of the events leading up to the war from the political angle and named persons and dates to corroborate his theories. Association members, almost without exception, voted the meeting as genuinely worthwhile.

GEORGE RENARD ADDRESSES CHICAGO ASSOCIATION

George A. Renard, executive secretary-treasurer of the National Association of Purchasing Agents was the guest speaker at the January 9th meeting of the Purchasing Agents Association of Chicago at the Hotel Sherman, Chicago, Ill. He delivered one of his timely "From one P. A. to Another" talks, in which he discussed the latest developments in purchasing and the current national economic and industrial picture.

The meeting, which was designated Past Presidents' and Past Secretaries' Night, was attended by many of the past presidents and secretaries who headed the association in former years. They were seated at the speaker's table, and those present also included some who are now engaged in other lines of business endeavor, but who were in attendance on special invitation from the Board of Governors. Several members, holding a record of 25 years' continuous membership, were awarded the 25-year Membership Plaque.

ROUND TABLE DISCUSSION BALTIMORE ASSOCIATION

The Purchasing Agents Association of Baltimore met at the Lord Baltimore Hotel, Baltimore, Md., January 22. Following the business meeting a round table discussion was held on current subjects and purchasing problems. Herb Gaston led the discussion.

(*Please turn to page* 246)

T & W FORGINGS

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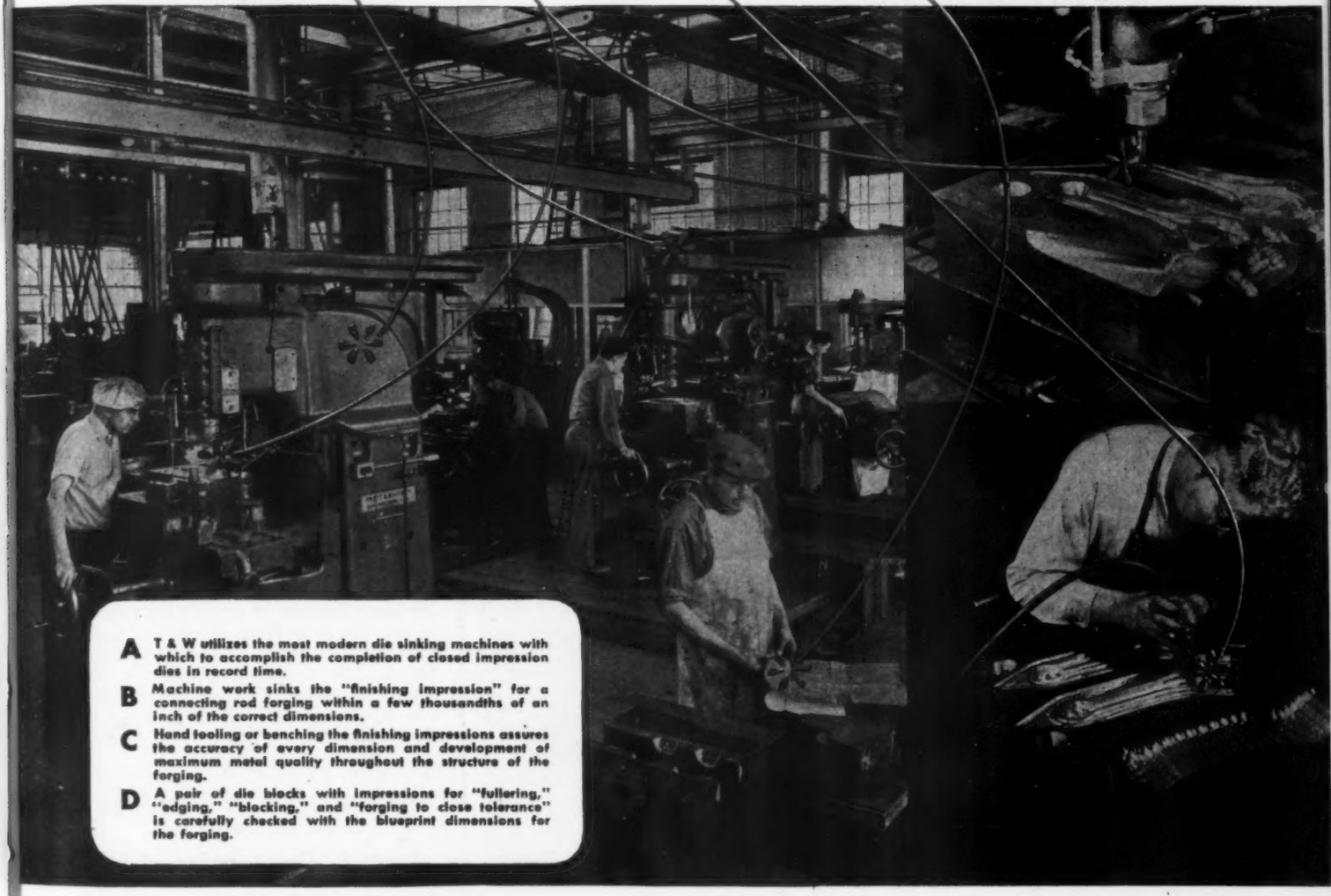
An urgent necessity in the reduction of costs is saving time, either from the standpoint of producing forgings or the time required to machine forgings for final use. It is the earnest desire of each T & W die designer to plan the steps of operation so that forgings are produced most economically and require minimum machine time. Forgings formed in T & W closed impression dies are usually formed to close tolerances. *These forgings have the effect of increasing the capacity of both machines and skilled craftsmen* because *there is less metal to remove.* Ask a T & W Forging Engineer about closed impression forging dies that are sure-fire cost reducing tools—dies for forgings that usually cost less at the point of assembly.



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"WORK SIMPLIFICATION" NEW YORK ASSOCIATION

"Work Simplification in the Purchasing Department" was the topic of an address by C. Stuart Brown, Director, Work Simplification, American Viscose Corp., before the Purchasing Agents Association of New York, January 21, at the Builders Exchange Club, New York City, N. Y. Mr. Brown discussed organized application of common sense to finding better ways of doing every job with special reference to the clerical detail of keeping records and handling papers in the Purchasing Department.

200 ATTEND AKRON CHRISTMAS DINNER DANCE

W. R. Lantz, purchasing agent, Sun Rubber Co., pictured above with Mrs. Lantz, acted as chairman at the annual Christmas dinner dance of the Purchasing Agents Association of Akron, held recently at Akron's University Club. Over 200 purchasing agents of the Akron area and their wives attended. Gifts were given to the ladies and Denny Thompson, a well known area orchestra provided the music.

EXECUTIVES' NIGHT MEETING ST. LOUIS ASSOCIATION

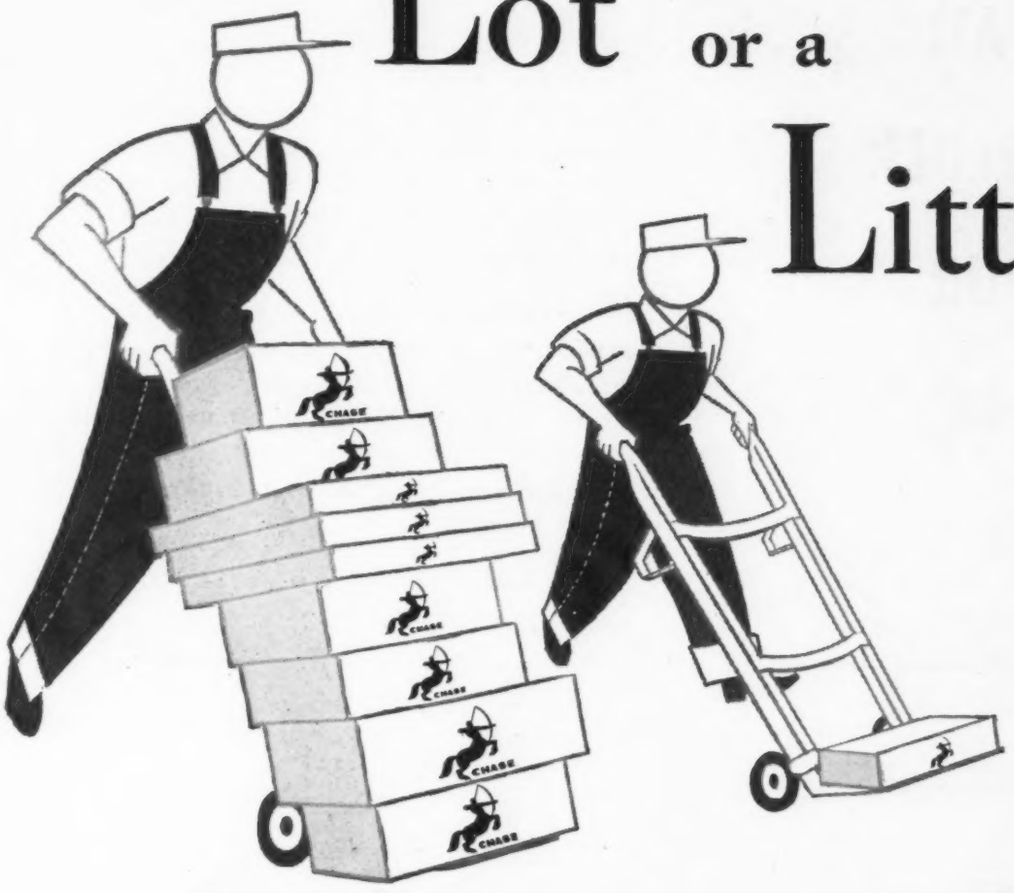
J. Wesley McAfee, president, Union Electric Company of Missouri, was guest speaker at the Executives' Night meeting of the Purchasing Agents Association of St. Louis, January 28 at the Club Caprice in the Coronado Hotel. Three St. Louis business men, D. H. Tilson, Aluminum Ore Co., R. C. Mueller, Shell Oil Co., and H. J. Mullin, Carnegie-Illinois Steel Co., gave short talks on "What's Ahead for Business".

HEINRITZ SPEAKS AT EXECUTIVES, NIGHT MEETING, ERIE

Stuart F. Heinritz, editor of PURCHASING Magazine, New York, was guest speaker at "Executives' Night" meeting of the Purchasing Agents Association of Erie, Pa., January 15th. He discussed the subject, "The Cost and Value of a Purchasing Department." A. F. Bortz, Lord Mfg. Co., was in charge of the meeting.

(*Please turn to page* 250)

For a Lot or a Little-



of BRASS or COPPER – see Chase...

BIG ONES... orders for carloads of sheet brass or miles of brass pipe. LITTLE ones too...for brass screws or soldering coppers. For a lot or a little, Chase is the Nation's Headquarters for Brass and Copper.

Chase warehouses—twenty of 'em from coast to coast—are your service stations for small orders. Larger orders get the expert attention of the Research and Production Departments of Chase mills in the East and Midwest.

Shortages are still causing delay, and we cannot accept all orders, sorry to say. But we're doing our very best to catch up with the demand for brass and copper products.

Chase Brass & Copper Co. Incorporated, Waterbury 91, Conn. A Subsidiary of Kennecott Copper Corporation.

Remember—CHASE SERVICE IS AS CLOSE AS YOUR PHONE

Chase
BRASS & COPPER CO.

Waterbury 91, Connecticut
SUBSIDIARY OF KENNECOTT COPPER CORPORATION

This is the Chase Network—handiest way to buy brass — INCORPORATED —

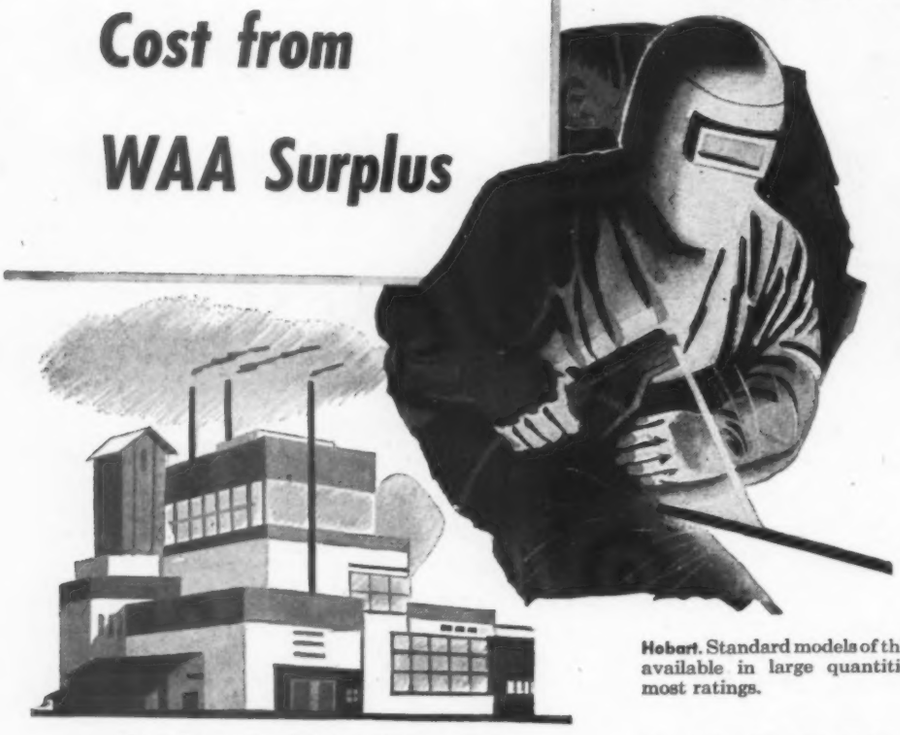
ALBANY† ATLANTA† BALTIMORE BOSTON CHICAGO CINCINNATI CLEVELAND DETROIT HOUSTON† INDIANAPOLIS JACKSONVILLE† KANSAS CITY, MO. LOS ANGELES MILWAUKEE MINNEAPOLIS NEWARK NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH PROVIDENCE ROCHESTER† SAN FRANCISCO SEATTLE ST. LOUIS WASHINGTON† (†*Indicates Sales Office Only*)

HERE'S AN ARC WELDER FOR YOUR SHOP—*At Minimum Cost from WAA Surplus*

Here are hundreds of arc welders available for immediate delivery. At WAA's low prices, no shop, however small, need be without a welder. And no shop is too big to fill its requirements from this large stock.

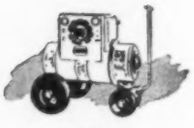
These are standard makes, the products of recognized manufacturers—in demand by garages, repair shops and maintenance shops and many production lines. Act today. Visit, phone or write your nearest WAA Regional Office for complete information on the availability and price of the machine you want.

All arc welders are offered subject to prior sale.

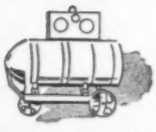


All Arc Welders are subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area and then to purchase the material offered herein.

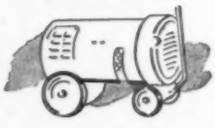
Exporters: Your business is solicited. If sales are conducted at various levels, you will be considered as a wholesaler. Any inquiries regarding export control should be referred to Office of International Trade, Department of Commerce, Washington, D. C.



Hobart. Standard models of this make available in large quantities and most ratings.



Lincoln. In all models and most ratings. Many in the popular 300-400 Ampere size.



Westinghouse. Portable models available in limited quantities. Electrodes and Welding Rods. Millions of pounds available in all types and sizes.

886

WAR ASSETS ADMINISTRATION

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Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

AIR KING TIRES *Engineered*...not just made

AIR KING TIRES are another example of team-work between ***Research, Engineering,*** and ***Manufacturing*** as applied by The Ohio Rubber Company to specific problems of an industry.

For years, manufacturers of juvenile vehicles, bicycles, lawn mowers, wheelbarrows, hand trucks, portable battery chargers, paint sprayers, and numerous other types of portable, rolling units, equipped their wheeled products with either pneumatic or solid rubber tires. Each type of tire has its advantages and disadvantages on practically every application.

ORCO RESEARCH surveyed the entire, complex problem. ORCO ENGINEERS analyzed the facts and developed new standards of design and construction. ORCO MANUFACTURING established ***standardized*** production operations.

The end result is the **AIR KING**... the semi-pneumatic CUSHION tire that combines the advantages of pneumatic and solid rubber tires with none of their disadvantages.

To insure uniformity of quality standards, **AIR KING TIRES** are subjected to "breakdown" tests for load, speed, and wear. As a final check, each **AIR KING TIRE** is tested before release for shipment. Products equipped with **AIR KINGS** offer "quality conscious" users top value through better, longer-lasting, trouble-free performance.

When YOU have a "problem in rubber"... ***CALL ORCO.***

ORCO rubber products OHIO RUBBER CO

THE OHIO RUBBER COMPANY · WILLOUGHBY OHIO · LONG BEACH CAL.

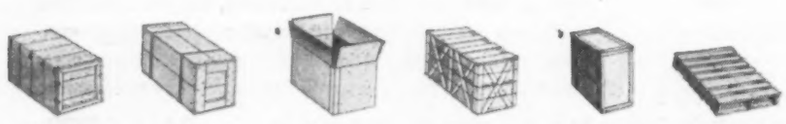
Branch Offices: DETROIT • NEW YORK • CHICAGO • INDIANAPOLIS • CLEVELAND • BOSTON

...by these GOOD names

you shall know us

These and hundreds of other users of shipping containers are numbered among our customers. Whatever the product may be—from pianos to precision parts—our 25 years' experience enables us to design containers that assure better protection, reduce shipping weight, and provide for increased production. Write today. We'll be glad to help you solve your packing problems. There's no obligation, of course.

Send for your copy of "The General Box." It's free—it's packed with facts of interest to you.



General All-Bound Box | General Nailed Box | General Corrugated Box | General Wirebound Crate | General Cleated Corrugated Container | Generalift Pallet

ENGINEERED SHIPPING CONTAINERS

25 YEARS YOUNG
1922-1947

General BOX COMPANY

GENERAL OFFICES: 48 W. Illinois St., Chicago 10, Ill.

DISTRICT OFFICES AND PLANTS: Brooklyn, Cincinnati, Detroit, East St. Louis, Kansas City, Louisville, Milwaukee New Orleans, Sheboygan, Winchendon, Natchez.

Continental Box Company, Inc.: Houston, Dallas.

25 years' experience in designing better containers for all industry.

BENNET CERF ADDRESSES PHILADELPHIA ASSOCIATION

Bennet Cerf, publisher, anthologist, humorist, columnist, was guest speaker at the January 19 meeting of the Purchasing Agents Association of Philadelphia, at the Bellevue-Stratford Hotel, Philadelphia, Pa. Mr. Cerf's subject was "Changing Styles in American Humor." A discussion of Purchasing Problems was also held under the leadership of Wesley W. Saatkamp, Chairman.

Prior to the regular meeting which began at 6:45 p. m. a forum was held at which Edward J. Webb, Jr., and Frederick R. Lodge, both of the Bell Telephone Company of Pennsylvania, delivered a lecture on "Mobile Telephone Service."

The 1947 officers of the Philadelphia association, recently appointed, include:

President—H. F. Jones, E. I. DuPont de Nemours & Co.

1st vice-president—Clarence J. Miller, Arthur H. Thomas Co.

2nd vice-president—R. George McMinn, Berwind-White Coal Mining Co.

Secretary-treasurer—E. Wayne Jenkins, Coleman & Co.

National director—W. L. Thompson, Westinghouse Electric Corp.

Executive-secretary—Harold I. Patten.

LOUISVILLE ASSOCIATION CHRISTMAS PARTY

The Purchasing Agents Association of Louisville held its annual Christmas party, in December at the Henry Clay Hotel, Louisville, Ky. The meeting which dispensed with all business followed a dinner at 6:00 p.m.

A barber shop quartet lead by attendance chairman Harold Borders featured the meeting. Entertainment consisted of a bingo game for special prizes and general good fellowship. Numerous door prizes were awarded during the evening. George Lewler, chairman of the entertainment committee was in charge.

INDUSTRIAL FINISHES TOPIC N.W. PENNSYLVANIA ASSN.

Frank Smith, E. I. DuPont de Nemours & Co., addressed the Purchasing Agents Association of Northwestern Pennsylvania at their January 9th meeting at the Carver Hotel, Warren, Pa. He spoke on the subject of Industrial Finishes and concluded his talk by showing a selection of slides illustrating what could be done with certain finishes from both the efficiency and beautification standpoint.

E. C. Walker, Kendall Refining Co., Bradford, Pa., spoke briefly on the coal situation and its future potentialities. H. W. Ledebur, Hammond Iron Works, Warren, Pa., lead a discussion on Steel. Following this the subject of Fuel Oil was discussed by W. E. Cooney, National Forge & Ordnance, Irvine, Pa., and T. F. Servatius, Northeastern Container Corp., spoke on the subject of Containers.

(*Please turn to page* 252)

For tough nut-turning operations specify Snap-on

Snap-on's Blue-Point Boxockets are stronger . . . safer . . . and require only half the space

Here is safe, powerful leverage that invites confident wrench speed. See how easily it slips into those hard-to-get-at places . . . engaging the nut on all six corners with an encircling "no-slip, no-spread" grip.

Snap-on Boxockets combine *speed* with *safety* on tough nut-turning operations . . . and because of their double broaching, they need only *half the turning space* required by an end wrench when handle movement is limited. Among the many advantages of Boxocket construction are the long, round-shaped handles with a comfortable, full size hand grip that give you powerful leverage; and the placing of the wrench heads at an offset from the handle to give clearance from obstructions.

The complete "double-offset" series contains a full range of sizes from 3/16" up to and including 3 1/8". Available through Snap-on's nationwide, direct-to-user tool service.

Write for the new Snap-on catalog.

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SNAP-ON TOOLS CORPORATION

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ARE YOU BUYING ROPE TO BE USED IN MINES?

THEY NEED THE BEST!

For surface and underground operations, at mills and smelters, there is the outstandingly superior rot-proof, waterproofed, durable rope—Whitlock Waterflex Manila! This rope, manufactured from high-grade Manila fibre, is treated by our well-known Waterflex Process, a combination of waterproofing and lubrication at its best. When ordering from supplier specify Whitlock Waterflex Cordage.

WHITLOCK

WHITLOCK CORDAGE COMPANY
46 SOUTH ST., NEW YORK

Metropolitan Buyers Discuss Plastics

End Use of Product Determines Type of Plastic to Use
Many Base Types and Formulations Available

Commending members of the Metropolitan Purchasers Assistants Club at their first 1947 meeting at Midston House, New York City, on January 14, for commencing the year with an analytical discussion of plastics, Associate Editor George Henry of *PURCHASING* Magazine, declared that such commodity discussions marked a very progressive step in group educational work. "Commodities," he said are the very heart of your job; they are the reason you have a job, for they are the things you are buying.

"As a Western saying goes," he continued, "You can't make a rider out of yourself by polishing your pants on a saddle." In like vein you can't make purchasing agents at the much desired management level by merely copying requisitions, being nice to salesmen, and being a tactful expediter. A working knowledge of the products that your company is making—the materials used and the production processes—and like information about the materials and components you are buying is one of the fundamentals of proficient procurement."

He suggested that men and women in industrial purchasing would do well to adopt as a guide for their purchasing activities, the quaint verse by Kipling, long ago adopted by members of the writing and reporting clans as a guide for their work, which reads as follows:

"I keep six honest serving men
"They taught me all I know
"Their names are What and Where and When
"And How and Why and Who

"If you were to use these 'serving men' for getting acquainted with the materials that you are buying," he said, "and for analyzing the production facilities and products of your company and those of your suppliers, you undoubtedly would have a more intimate knowledge of the materials you are buying than any one else in your organization. You would be laying the groundwork for Purchasing at management level. And management and the various department heads would know that you have something on the ball besides integrity, personality and the executive ability to efficiently run your department.

"The only requirement is that you do the simple things that make men big. You have to think, analyze, plan; get really acquainted with the things you are buying from raw material to the end use of the products made therefrom. Then you can cooperate with planning, production, sales and management in a practical way. Cooperation is not very fundamental that merely involves referring news items and advertising matter to others, or directing salesmen through your doors to other departments. Functional cooperation involves know-what and know-how.

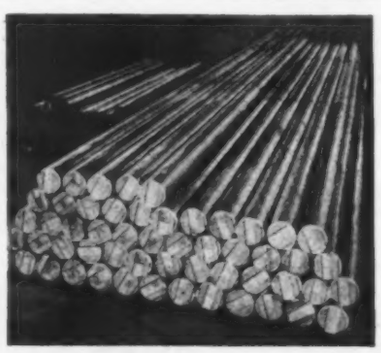
"Plastics," he pointed out, constitute an excellent subject for you to start on, for the reason that plastics are now—brand new. The plastics industry is in swaddling clothes. Those of you who attended the recent plastics exposition in New York City know that plastics in one form or another have injected themselves into almost every phase of our industrial and commercial economy.

"They have been adopted for civilian use in almost every activity from the cradle to the grave, as evidenced by the teething rings, the vinyl pants for babies, the toys, the celanese and nylon fabrics, the house furnishings, gadgets, parts of appliances, and finally the huge plastic casket.

"In spite of all these visible evidences of the intrusion of plastics in our daily life and their extensive utilization by industry in mechanical things, I am quite sure that if that great philosopher, Mark Twain, were here to discuss them he would say that everybody talks about plastics, but nobody knows much about them. And, in that though lies both opportunity and responsibility for industrial buyers.

"From your standpoint as representa-

(*Continued on page* 254)



Welded Stainless Tubing

4" to 14¾" O.D.

Uniformity in roundness and in quality of welding characterizes Pittsburgh Piping Welded Stainless Tubing. Available in most stainless alloys, in sizes 4" O.D. to 14¾" O.D., and in wall thicknesses ranging from 7/64" to ½". Write for data sheet.

PITTSBURGH PIPING & EQUIPMENT CO. 10 FORTY-THIRD ST., PITTSBURGH, PA.

The Udylite Semiautomatic Plating Machine with one operator who merely loads and unloads the racks will turn out as much work in a given time as a battery of still tanks with a number of operators. And it doesn't require a skilled operator either.

Specifically here's what this machine will contribute to your plating operation.

The new bulletin just off the press will give you complete details. Write for your copy today.

1. **Provides greater production.**
2. **Greater process control and therefore greater product uniformity.**
3. **Greater flexibility to meet emergencies.**
4. **Significant economies in man-hours, floor space, time and metal consumption.**

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THE Udylite CORPORATION

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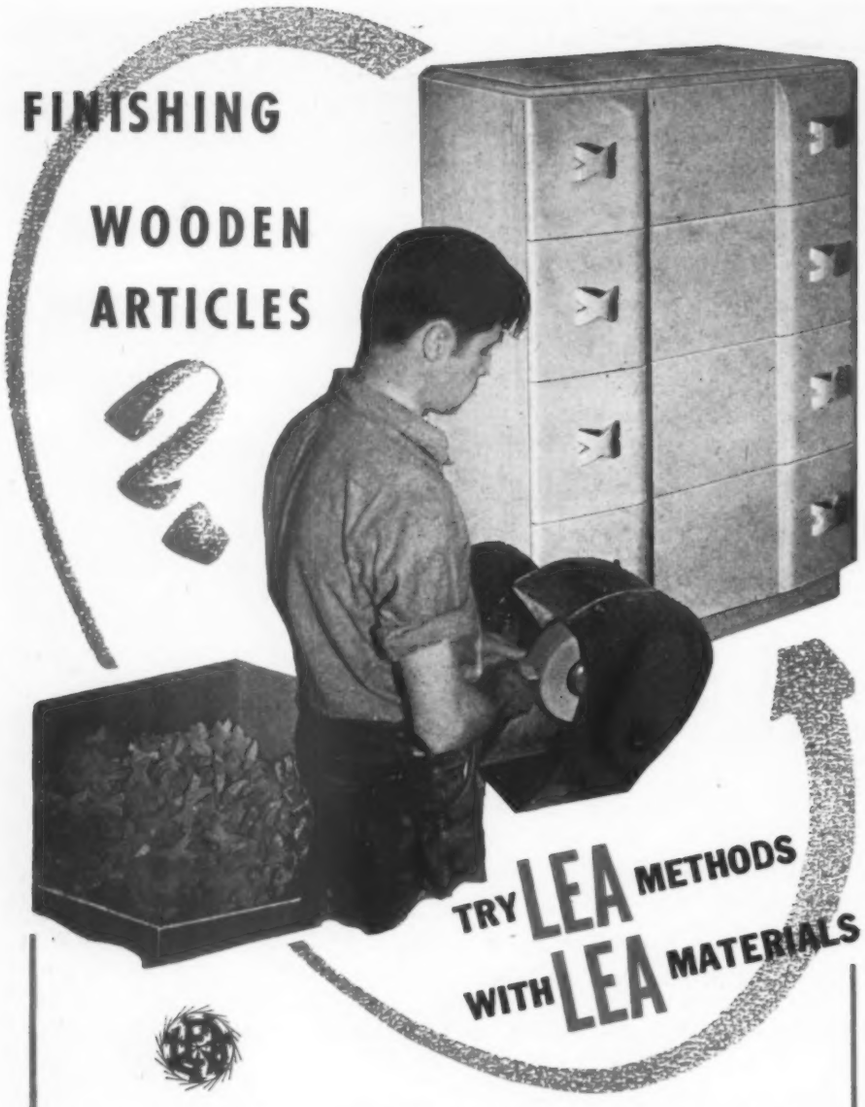
REPRESENTATIVES IN ALL PRINCIPAL CITIES



Lea of Waterbury, long established in the metal and plastic finishing field, is more and more being called upon by woodworking plants for help in working out better and more economical finishing methods. Here, for instance, is an excellent example of LEA at work on wood. The operation is finishing wooden pulls for the attractive "Modern" furniture designed and manufactured by The Heywood-Wakefield Company, Gardner, Massachusetts. Assisted by Lea Finishing Engineers, Heywood-Wakefield worked out a suitable method using Lea Compositions.

LEA holds the key to speed, economy and flexibility in finishing wood as well as metals and plastics. If you are producing wooden articles and if finishing is a necessary step, perhaps our technicians can be of help. They have the necessary broad finishing experience plus a wide selection of greaseless and "no-free-grease" compounds for doing the job. Send us samples for laboratory method testing so we can make recommendations.

THE LEA MANUFACTURING CO.

Serving, Buffing and Polishing . . . Manufacturers and Specialists in the Development of Production Methods and Compositions

16 CHERRY AVENUE • WATERBURY 86, CONNECTICUT

(*Continued from page 252*)

tives of industrial procurement, the fact stands out that the merits of plastics, their use possibilities and their use limitations are not very well understood by 99.4% of industry's sales managers, marketing experts, or members of management, who are likely to say: 'Yep, plastics are the coming thing. We ought to be using them.'

"The fact is that few people understand that there are some 30 base types of plastics, and literially thousands of special formulations. Few people know much about the complex character of these new materials, except those who are members of the plastics industry, and they will tell you that there is no one who knows all there is to know about plastics. In fact, the plastics industry is quite worried about the misuse and abuse of plastics by unscrupulous and uninformed people within and without the plastics fields.

"The manufacturers of plastics molding materials have in many cases rejected big orders where they were unable to secure information about the type of products they were wanted for.

30 Base Types

"The thirty base types of plastics make up two distinct family groups, namely, the thermosetting plastics which after going through the molding process of heat and pressure, are heat cured and set for life, as are ceramics; and, the thermoplastic group. The thermoplastics are molded under heat and pressured and set by cooling. The thermoplastics can be remelted and used over and over again.

"The most extensively used of the plastics in the thermoplastic group are the cellulose acetates.

"Now here's an important factor that is not generally understood. The phenolics, for instance, are made in four major classifications, according to the type of fillers used. There is the general purpose group, the high impact and electrical, the heat resistant and the special property groups. The fillers used in the molding compounds are quite diversified, and the list includes wood flour, cotton flock or fabric, asbestos, mica, paper, ground nut shells and other materials, according to the service qualities demanded of the molded product. These classifications in turn, as previously mentioned, are the basis of unlimited special types of molding materials. One of the big companies has more than 2000 formulations; another a thousand, another 300, and so on. There are also varying formulations in other thermosetting types, and in the numerous themoplastics.

"Plastics vary as much as does the human race. They differ in color, weight and toughness, and dimensional stability; they react differently to varying temperatures, to moisture, and light; some are good for one kind of a job, and of no value whatsoever in another that some other plastic would admirably fill; and their eye appeal is as varied as a Fifth Avenue Easter parade or bevy of Powers models

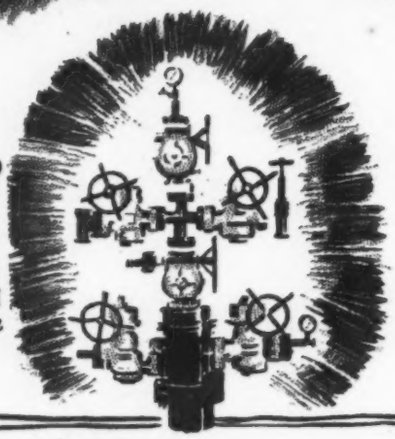
(*Continued on page 256*)

LADISH CO., CUDAHY, WISCONSIN
To Better Reflect the Expanded Scope of Our Operations and Products . . .
We announce a change in corporate name only
from
LADISH DROP FORGE CO.
to
LADISH CO.
CUDAHY • WISCONSIN
MILWAUKEE SUBURB
L
TO MARK PROGRESS
WATCH FOR AN IMPORTANT ANNOUNCEMENT IN THIS MAGAZINE DURING MARCH

CAN YOU GUESS THE ANSWERS?

WHERE IS A CHRISTMAS TREE USED THE YEAR AROUND?

In oil fields. There, a "Christmas Tree" means a series of pipes, valves and fittings. It is mounted on top of a well and meters the flow of oil. Many pressure gages on "Christmas Trees" are made by ACCO's Helicoid Gage Division.



HOW MANY MUSKRATS MAKE A FUR COAT?

The backs of about 240 muskrats go into an average size fine quality coat. Trap chains used in catching animals are just one of the complete line of chains for every use made by ACCO's American Chain Division.

WHAT'S ON TOP OF THE WASHINGTON MONUMENT?

An aluminum cap. It was placed there in 1884 and is still in good condition—because aluminum resists corrosion. Chain link fence of aluminum fabric, made by ACCO's Page Steel and Wire Division, also gives years of trouble-free service.

These are only a few of the primary products made by the 17 divisions of ACCO: Chain • Wire Rope • Aircraft Cable • Fence • Welding Wire • Cutting Machines • Castings • Wire • Springs • Lawn Mowers • Bolts and Nuts • Hardness Testers • Hoists and Cranes • Valves • Pressure Gages • Automotive Service Equipment.

ACCO

AMERICAN CHAIN & CABLE BRIDGEPORT CONNECTICUT

(*Continued from page* 254)

"This does not mean that you have to be a top chemist to intelligently buy plastics, anymore than you have to be a metalurgist to buy steel. But you should be familiar with the basic types, their use values and limitations, molding factors, and costs. Such information will be invaluable to you as a buyer of plant equipment, business machines, office furniture, equipment and supplies, packaging, and so on, which may have components made of plastic or be made wholly of plastic, bonded with a plastic resin, or finished or decorated with plastic film or foil, or veneer.

"And it will be of prime importance in buying plastic components that your company may require, or in event plastics may be suggested as substitute or alternate materials for other materials now used, or should it be decided to enter the market with products entirely made of plastics.

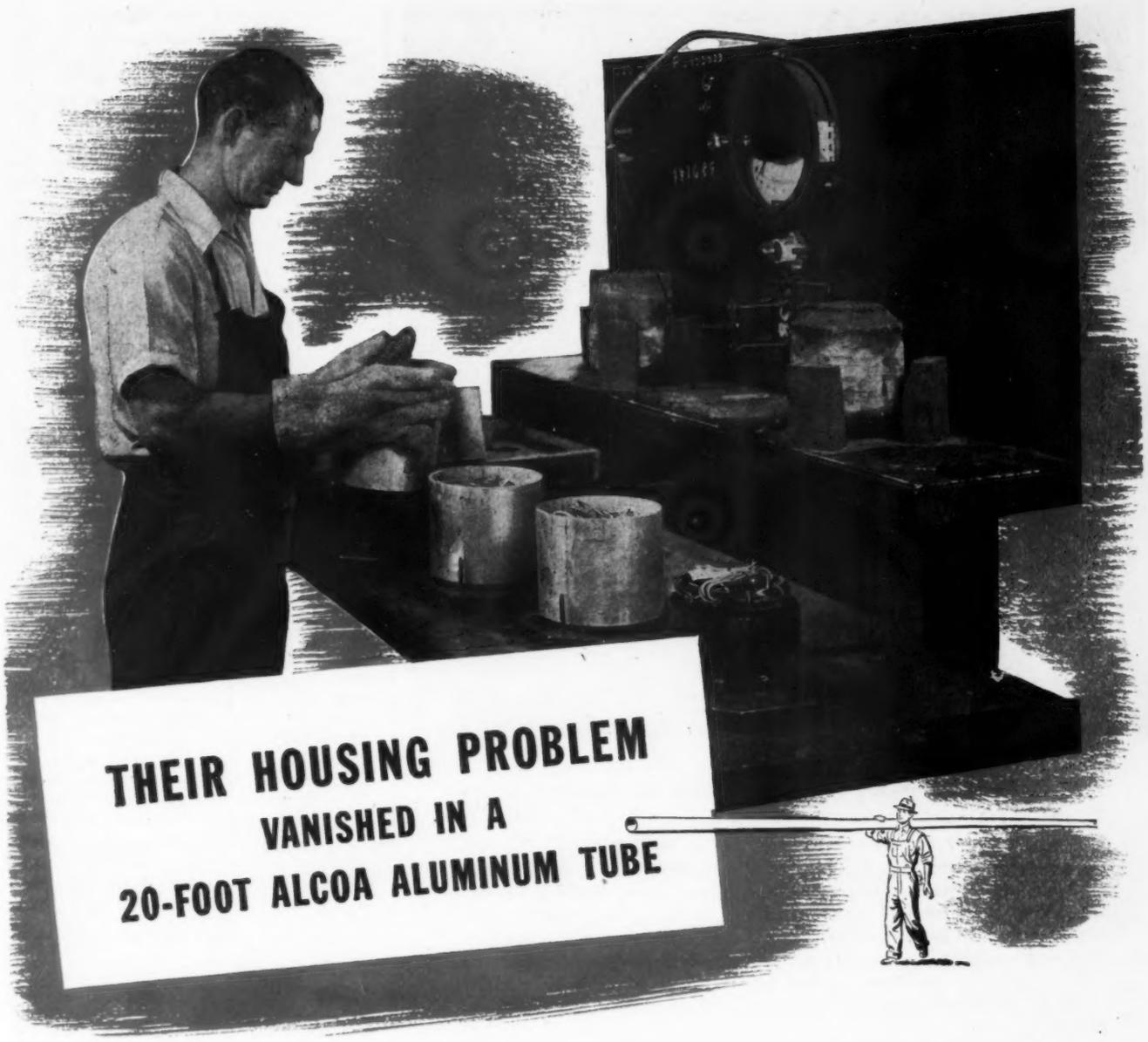
"In this connection it is well to bear in mind that as a rule the names that plastics manufacturers have used to identify their respective products, are in no way indicative of their type. For instance, I believe you will agree that it is impossible to extract a connotation of phenolic resin from the name 'Marblette.' My immediate interpretation of the name if I were not familiar with it, would be that of a plastic resembling marble. Another example is the name 'Fibestos.' I believe most persons would feel that it is the name of a plastic employing asbestos. It is the tradename of a cellulose acetate. And as you go through the hundreds of names of plastics, you will find many that are equally mysterious, such as Haveg, Loalin, Cerex, Fiberlac (which is a cellulose nitrate lacquer), Forticel, Plastacele, Beetle, and and so on. Beetle, by the way, is a urea formaldehyde, and I understand that tradename was born of the fact that a beetle was found in the technical papers about its formulation.

"Two of the important factors in the plastics field, use a generic term for all of their products. For instance, the word Bakelite is used with the numerous products made by the Bakelite Corporation. And Textolite may be one of a large number of plastic products of the General Electric Company in both the thermosetting and thermoplastic groups, including Nylon.

"In other words, there are numerous names for the cellulosic plastics and others in the thermoplastic group, and many trade names for the various plastics and fromulations in the thermosetting group. You can readily understand the importance of being familiar with these names and the products they represent, in competitive buying. At least you should have a record of them, so that you will not be hampered in your relations with molders and fabricators.

"The first thing I shall emphasize about plastics, so far as use is concerned, is that utilization of a plastic should be based entirely on end use of product, and next, moldability of design, if a molded products is being considered. The

(*Continued on page* 258)



One slash with a cutoff saw, a couple of minor machining cuts on the ends of each sawed section, and 20-foot lengths of Alcoa Aluminum Tubes become housings for the electric motors made by Standard Dayton Corporation.

The tubes require no boring. They are merely heat-expanded and slipped over the stators. On cooling, they fit tightly.

What's more, the aluminum housings give a reduction of one-third in motor weight and faster dissipation of motor heat.

When you design a new product, or redesign one already on your assembly line, consider the many commercial forms of Alcoa Aluminum. And our 59 years of aluminum know-how is at your service. ALUMINUM COMPANY OF AMERICA, 1931 Gulf Building, Pittsburgh 19, Penna. Sales offices in leading cities.

MORE people want MORE aluminum for MORE uses than ever

ALCOA FIRST IN ALUMINUM

IN EVERY COMMERCIAL FORM

NOW EVEN MORE CONVENIENT...

STARRETT
Precision Ground
FLAT STOCK

COMES IN TWO TYPES

Oil Hardening

A non-deforming, electric furnace tool steel, fully spherodized annealed with fine grain structure and deep hardening characteristics. Ideal for precision parts requiring accuracy of size after hardening.

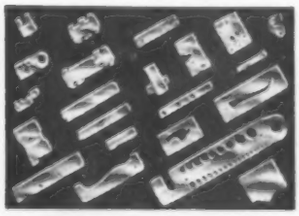
Water Hardening

A high grade tool steel specially made to Starrett specifications. Annealed for easy machining. Develops maximum hardness when quenched in water or brine and may be drawn to any desired temper in oil.

Save time on countless jobs of making templates, test tools, gages, dies, small parts and miscellaneous pieces.

With Starrett *Precision Ground* Flat Stock, you simply lay out the part and go ahead. No hunting for odd pieces of stock, no time lost on preliminary roughing or precision grinding to size. Made in 18 inch lengths in width from ½ to 6 inches and in thicknesses from a sixty-fourth to an inch or more. The two flat sides are precision ground parallel and straight to within .001 inch of size. Ends are machined square and sides are ground parallel and square. Each piece is individually wrapped for complete protection and clearly identified for storage and selection.

Keep a stock of frequently used sizes in the tool crib or buy it as needed through your mill supply distributor. Write for Ground Flat Stock Folder and Chart "P" which gives complete information, list of sizes and hardening instructions.



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TEST TOOLS	PARALLELS	TEST GAGES
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PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK
HACKSAWS • BAND SAWS FOR CUTTING METAL, WOOD, PLASTICS

(Continued from page 256)

success of any plastic product is dependent entirely upon the adaptability of the plastic to the end use of the product, whether the product is molded, extruded, drawn, stamped, a plastic assembly, or a cast plastic.

"Do not hesitate to consult with the technical departments of the plastics material manufacturers, or with competent molders who may be recommended to you. Then you will receive authoritative advice as to what type of plastic should be used, and in the case of molded products, whether the proposed design is moldable, or what changes should be made in a design to make it moldable."

Mis-use of Plastics

The speaker cited several cases of product failure that might have been avoided had the persons placing orders for plastics products, been familiar with the chemical and physical qualities of the base plastic types, or at least shown good judgment by consulting with the technical departments of the plastics materials manufacturers.

One of the product failures mentioned involved lipsticks, in the production of which a plastic was used that was adversely affected by the essential oils used in lipsticks. Another instance cited the failure of a plastics fruit knife because the plastic used had a high factor of moisture absorption and was also affected by the citric acids of fruits. In another case, a lady's handbag manufacturer used a salvaged plastic material that was originally formulated as an insulator for electric-power wires. In all these cases, the plastics used were misused, and the products made therefrom were market failures.

General Knowledge Necessary

"The importance of having at least a general knowledge of the characteristics of the different base plastics, is reflected in the following list of physical, chemical and electrical qualities that technical men in the plastics industry take into consideration when selecting a plastic for a product or part:

"Under the heading 'Physical' the principal factors taken into account are toughness, mechanical strength, cold flow, hardness, heat resistance (continuous heat), dimensional stability, thermal insulation, specific gravity, flammability, and appearance, the latter referring to color possibilities and color stability.

"Under the heading 'Chemical', the principal factors are: Water resistance, alkali resistance, acid resistance; organic solvent resistance.

"And under 'Electrical', dielectric strength, loss factor, and resistivity. Also, the use of inserts, and ease of molding.

"The foregoing, taken from a chart published by the Bakelite Company, not only indicates the important things that must be taken into consideration in connection with the end use of the product, but also tells why the sales manager or

(Continued on page 260)

Dear Friend:
There is not much left on this roll of Okonite Manson Tape but I have been peeling a little off this roll for 25 years and I thought that you might like to hear what happens to Okonite Tape. This roll has been in my possession since 1917. I save the original tin box and always keep the tape in it and the little bit that is left is still good. I thought you might like to have it for a souvenir.
Manson Tape

MANSON TAPE—STILL GOOD AFTER 25 YEARS

A quarter-century after he purchased this roll of Manson Friction Tape, this customer* returned what little remained on the core for test. Here's the laboratory report:

"This is the oldest roll of Manson Tape . . . or any friction tape . . . which we have ever examined. This tape still has sufficient adhesion quality to stick and stay put when wrapped as on a joint or splice. There was insufficient tape remaining to conduct all tests. We did, however, make several tests given in ASTM Spec. for Friction Tape D69-28.

"The tensile strength showed 51.2 pounds and 49.3 pounds per inch of width compared with ASTM specified minimum value of 40 pounds per inch of width.

"The tape withstood the ASTM dielectric strength test of 1000 volts without breakdown."

When your electrical department specifies Okonite and Manson Tapes, you're sure to get lasting value. For further information on these tapes, and on how to make a perfect splice with them, send for Bulletin OK-1007. The Okonite Company, Passaic, N. J., makers of insulated wires, cables and splicing tapes.

OKONITE SINCE 1878 **OKONITE and MANSON TAPES**

4843

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WASHERS
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STAMPINGS
OF EVERY DESCRIPTION
FOR EVERY PURPOSE...
UTILIZING MORE THAN
22,000 SETS OF DIES
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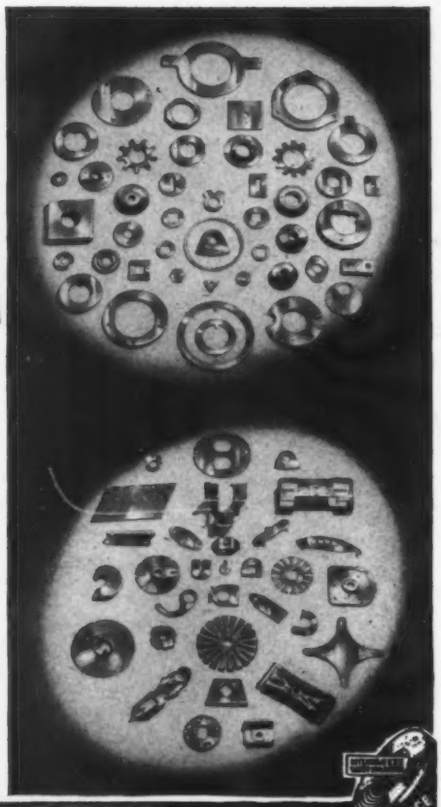

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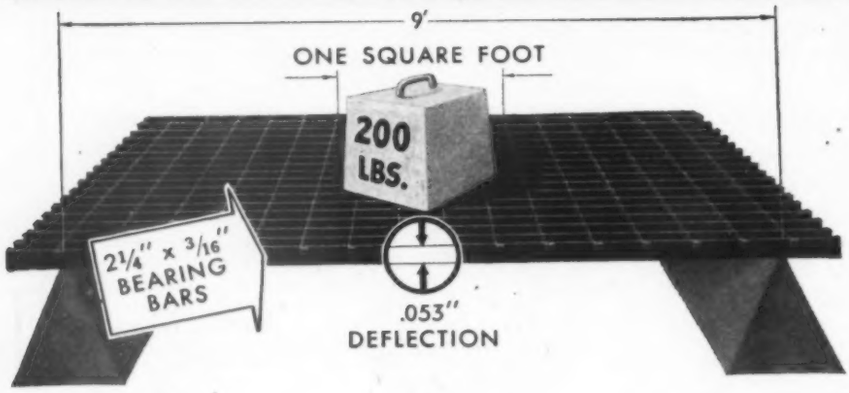
THE WORLD'S LARGEST PRODUCER OF WASHERS
2113 SOUTH BAY STREET • MILWAUKEE 7, WISCONSIN

This is TRI-LOK
OPEN STEEL FLOORING



The locked in strength of TRI-LOK enables it to stand up under heavy loads—even on long spans. No rivets, bolts or welds are used in its construction, thus, the possibility of loose joints is eliminated. *Write for Bulletin 1140.*

DRAVO CORPORATION
NATIONAL DEPARTMENT
300 Penn Avenue, Pittsburgh 22, Pa.
(*Distributor for THE TRI-LOK COMPANY*)

DRAVO

(*Continued from page* 258)

the boss cannot casually decide 'to make it out of plastic.'

"And then in the case of molded products, design must be given careful study. The planning department may create a beautiful design, overlooking that molded parts must be removed from the molds, and that the design must facilitate such removal. There are at least two dozen design pitfalls which are not understood by persons not familiar with plastics molding. Undercuts are taboo on small diameters and costly on big ones. Thin walls adjacent to heavy sections, holes near edge or face, irregular shape inserts, oblique holes, and many other factors may cause product failure, or a costly number of rejects. Then the end use of the products will determine what type of plastic should be used, and this in turn will dictate the molding process and type of mold.

"Molds are expensive, and molders will tell you that though you may feel that a quoted price may seem high, that it is a mistake to use cheap molds, for they may break down, be subject to spreading or rapid wear, and prove far more costly than a good mold. There are many other things to consider such as tolerances, production runs, multiple molds, use of what are known as preforms in molding the thermosetting materials, and getting bids on jobs, that warrant careful consideration—and consultation with reliable molders.

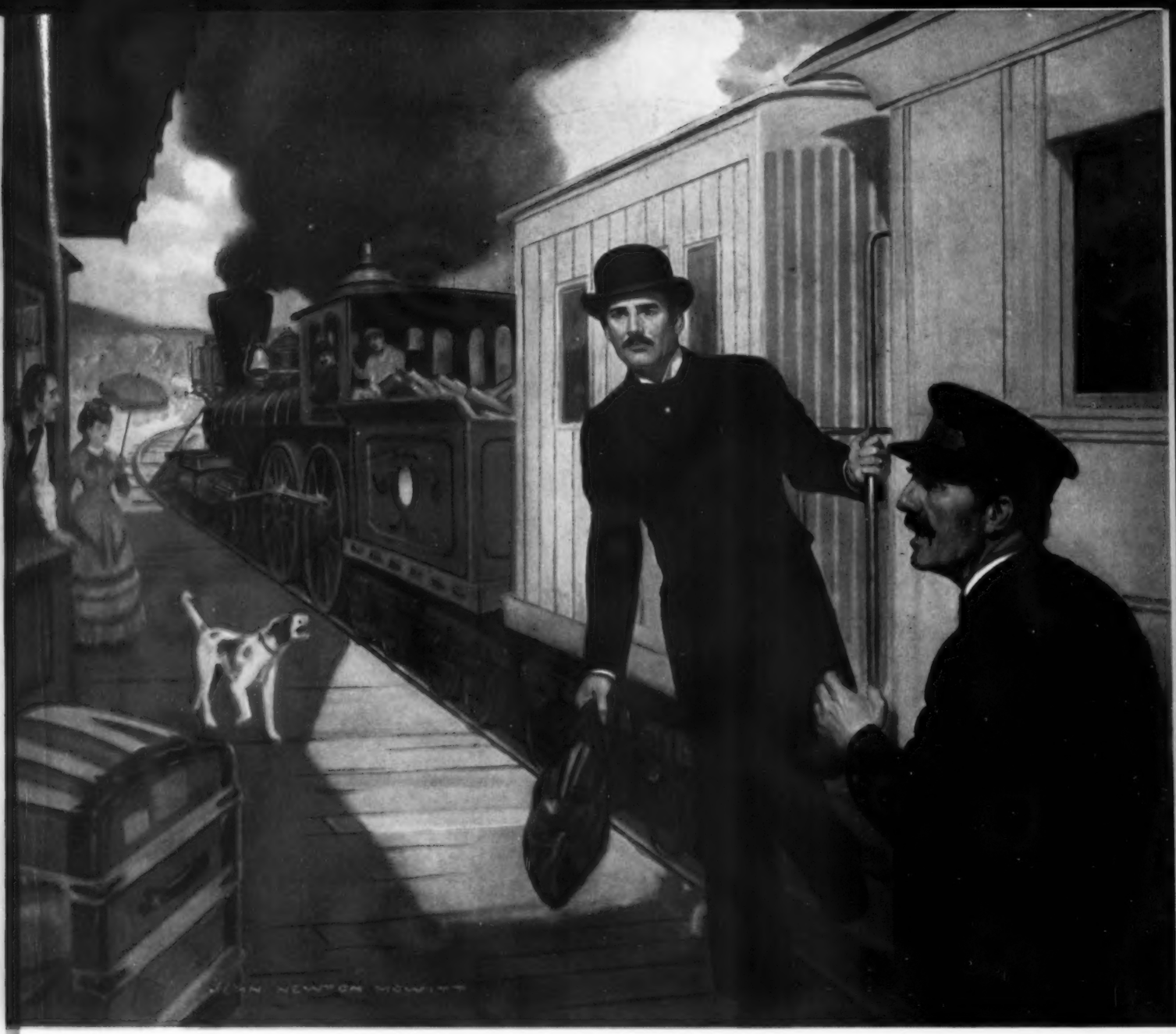
Use Factors

"As evidenced by the myriad of products now available made wholly of plastics, or utilizing plastics components, plastics have adequate strength to meet service requirements where high temperatures are not involved. The temperature limit for practically all of the thermoplastics range from 160 to 200 degrees, though there are one or two special formulations that will withstand boiling water, and the new Silicones developed by the Dow Corning Company will withstand temperatures up to 400 degrees F. Also, special formulations in the thermosetting groups will withstand temperatures up to 300 degrees Fahrenheit.

"I feel that the most important strength factor in plastics is their impact strength —that is their ability to withstand knocks, drops, and general rough usage such as your telephone handset gets, and many tools, such as hand power tools, hammer-heads, chisel heads, saw handles, and toys. The toughest of the plastics are the polystyrenes, the cellulose nitrates, ethyl cellulose, cellulose acetate butyrate, and the shock resistant melamines and phenolics.

"Corrosion resistance is one of the important use values. Plastics have varying degrees of resistance to alkalis, acids, solvents, oils, etc., but all types are not immune to all of these things. Some are attacked by certain weak acids and alkalis, while others are utterly indifferent to aqua regia, concentrations

(*Continued on page* 264)



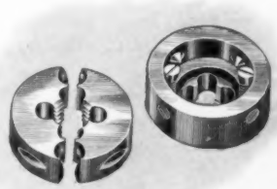
John J. Grant comes to Greenfield

In 1872, a man stepped off the train in Greenfield, Massachusetts, bringing with him a patent for a revolutionary kind of a threading tool—a two-piece die* which would cut accurate threads in one simple operation. The man was John J. Grant. Thus, 75 years ago, began an industry which was to grow until this quiet New England town became the world's center for the manufacture of precision threading tools.

Through these years GTD "Greenfield" has pioneered constantly in developing better taps and dies. Today, wherever metal work is done, the name GTD "Greenfield" stands for the finest in threading equipment.

GTD Greenfield 75th YEAR

*Grant's die consisted of two adjustable half-discs of metal threaded on the inside and set into a metal frame or "collet". This was the first effective threading die. It would cut accurate threads on a rod in one operation. From this first basic design by Grant, all modern dies have been developed.



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The GEOMETRIC TOOL COMPANY
New Haven, Connecticut · In Its Fifty-Fourth Year
A DIVISION OF GREENFIELD TAP and DIE CORPORATION

Partial list of monsanto intermediates

This product list of Monsanto intermediates is published as a convenient reference — you may find it helpful in your long-range development plans.

Unfortunately, not all of these intermediates are presently available. Some are still in critical supply. Experimental samples on many of them are available, together with prices.

For technical data and other information, contact the nearest Monsanto District Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second St., St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

MONSANTO CHEMICALS
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ortho-Aminobicyclohexyl, Refined	ortho-Nitrobiphenyl, Technical
ortho-Aminobiphenyl, Technical	meta-Nitrochlorobenzene
ortho-Anisidine	ortho-Nitrochlorobenzene
para-Anisidine	para-Nitrochlorobenzene
Benzenesulfonic Acid, Technical	para-Nitrophenol
Benzoic Acid, Technical	ortho-Phenetidine
Benzotrichloride	para-Phenetidine
Benzyl Chloride	Phenol, U.S.P.
meta-Chloroaniline	Phenolsulfonic Acid, 65% and 70%
ortho-Chloroaniline	Phosphorus Oxychloride
para-Chloroaniline	Phosphorus Trichloride
ortho-Chlorophenol	Phthaloyl Chloride
para-Chlorophenol	Salicylic Acid, Technical
Cyclohexylamine	Sodium Benzoate, Technical
2,5-Dichloroaniline	Thiourea
2,5-Dichloronitrobenzene	para-Toluenesulfonamide
2,4-Dichlorophenol	Toluenesulfonic Acid, 94%
Dicyclohexylamine	para-Toluenesulfonyl Chloride
2,4-Dinitroaniline	ortho-Vanillin (2-Hydroxy-3-methoxybenzaldehyde, Technical)
2,4-Dinitrochlorobenzene	ortho-Veratraldehyde (2,3-Dimethoxybenzaldehyde, Technical)
ortho-Nitroaniline	

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POSITIVE CONTROL

LOWER UPKEEP

LONGER SERVICE

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INSTANT ACTION because a Quarter-Turn *fully opens* or *closes* these valves. They operate 16 to 28 times *faster* than screw-stem types.

POSITIVE FLUID CONTROL because cam presses seating surfaces firmly together in closed position, yet valve operates freely. Sealed bottom, bonnet and stem, prevent wasteful, outside leakage.

LOWER UPKEEP AND LONGER SERVICE because seating surfaces are protected in the closed position and turned completely out of the fluid path in the open position. Thus shielded from corrosion or erosion by fluids, longer life is assured.

HOMESTEAD QUARTER-TURN VALVES are made in sizes, types and metals for most of your valve needs; for pressures to 3000 pounds and temperatures to 750 degrees F. Consult our engineering department for special valves designed to your own specifications. Write for copy of Valve Reference Book No. 38.

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AT HEIGHT THAT'S RIGHT FOR ANY WORKER!

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"Ton Tested" for strength. Designed to fit any man or woman, tall or short, light or heavy. 4 height ranges—12-15", 15-21", 18-27", and 24-36". Adjustable foot rest if desired.

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C. G. Campbell, President

KEWAUNEE MFG. CO., ADRIAN, MICH.

(*Continued from page 260*)

of sulphuric acid, solvents and every day sweat. Some that are not affected by strong acids and alkalis, are soluble or swell in certain of the organic solvents. This sounds rather mixed up, yet it demonstrates why end use of a product must be given first consideration in the selecting of a plastic therefor.

"Electrical qualities of course are of prime importance in many uses. All plastics have good dielectric qualities and insulating value, but like burbourn or Scotch, some are better than others. Special formulations will resist very high voltages; some will carbon track incident to arcing, and the melamines in particular are free from cracking.

Dimensional Stability

"Dimensional stability is a very important factor to consider from the standpoint of product end use, and also molding. Some of the molding materials contain volatile solvents with resultant shrinking in the molding process, and in some cases, in the finished products as they age. Dimensional stability involves several factors such as compression strength, tendency to cold flow, and distortion under heat. The factor of heat resistance varies considerably. The thermoplastics will soften in temperatures ranging from 120 D. F. to 180 deg. F., though one or two compounds have been developed that will withstand boiling water. The range for the thermosetting materials is with one or two exceptions, from 240 deg. F. to as high as 450 deg. F. The polystyrene, polyethylene, phenolic heat resistant and certain of the vinyl plastics have high ratings for permanent dimensional stability.

"Another factor that you will want to consider is that of moisture absorption. This affects electrical qualities and stability. I believe the polystyrene and polyethylene plastics have the highest water-resistant rating, followed closely by vindylidine chloride, certain of the phenolics and the arc resistant melamine.

"From a general merchandising standpoint, color of course is of paramount importance. The cellulosic plastics and others in the thermoplastic group offer almost unlimited color range. In the thermosetting group the urea formaldehyde plastics and the cast resins such as Catalin also make an unlimited color range available. The melamines are also available in an interesting assortment of colors.

"As indicated, the subject of plastics is complex. The logical procedure in developing plastic products is to capitalize upon the advisory services available from the material manufacturers and competent molders, regardless of how simple the product or part may be. Also, beware of the low-price offers from molders and others who 'just acquired a fine lot of low-cost material.' I don't know of any commodity where procuring the right material of the right quality from dependable suppliers demands as careful attention as the procurement of plastic products, components, or materials for fabrication."

(*Please turn to page 266*)

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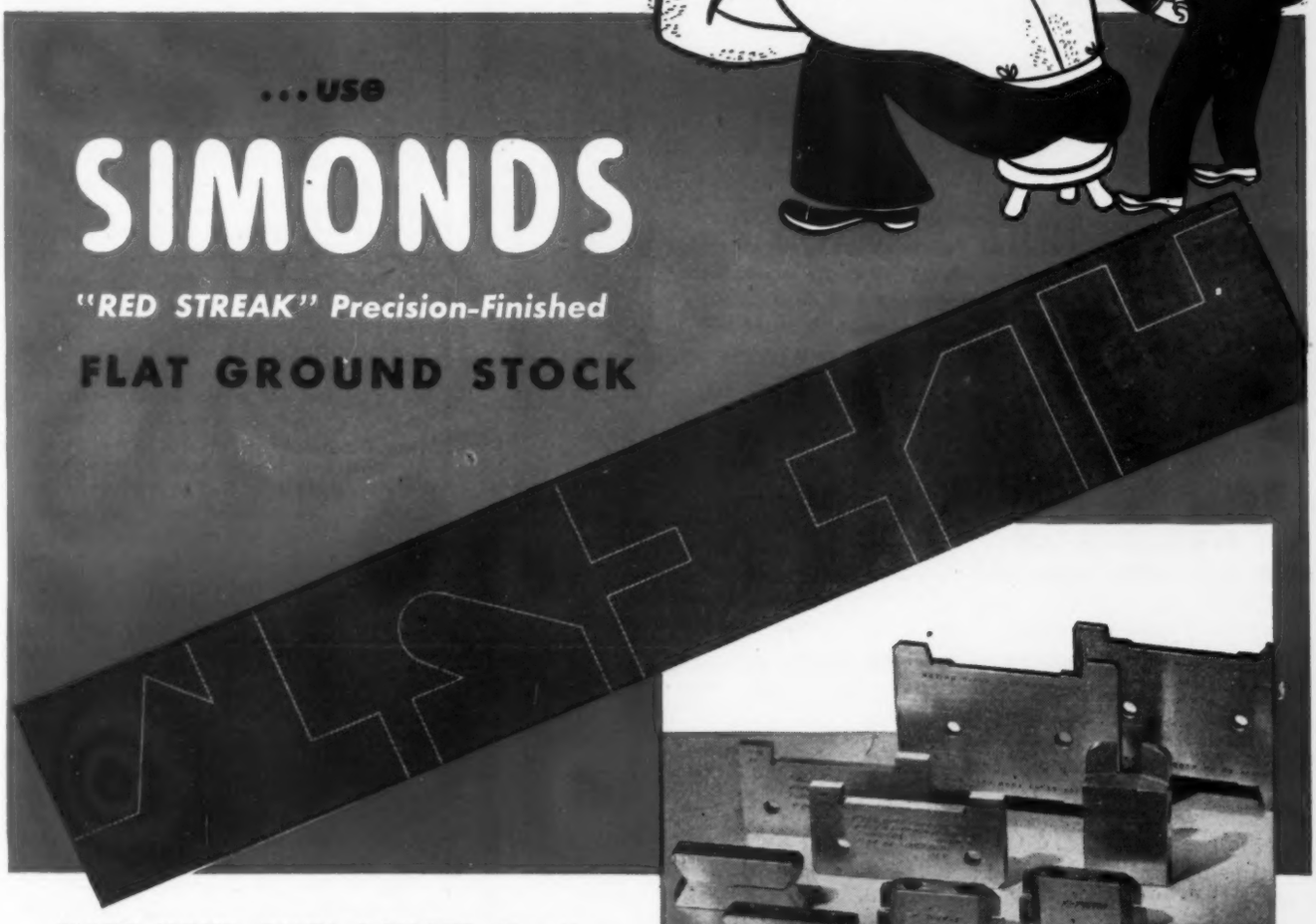
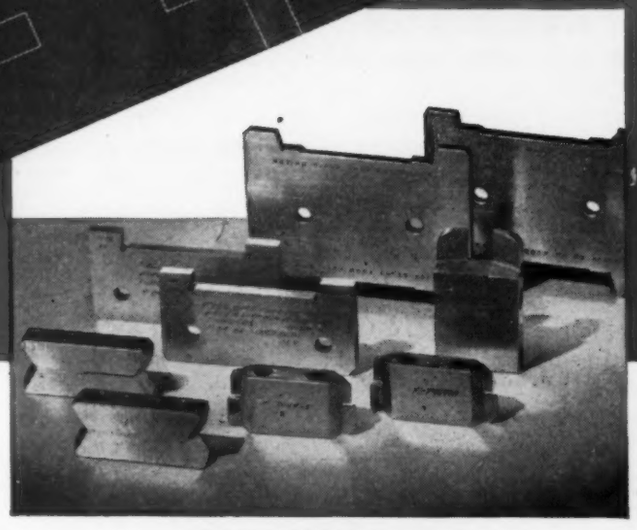
"RED STREAK" Precision-Finished

FLAT GROUND STOCK





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SAVE TIME AND MONEY with this Flat Stock which is cut to 18" length and accurately ground to standard thicknesses and widths. *No need for the expensive machining required to grind ordinary stock to size.*

145 STOCK SIZES . . . special sizes to order. Get "Red Streak" Flat Ground Stock from your Simonds distributor, or the nearest Simonds office. Immediate delivery from stock on most sizes.

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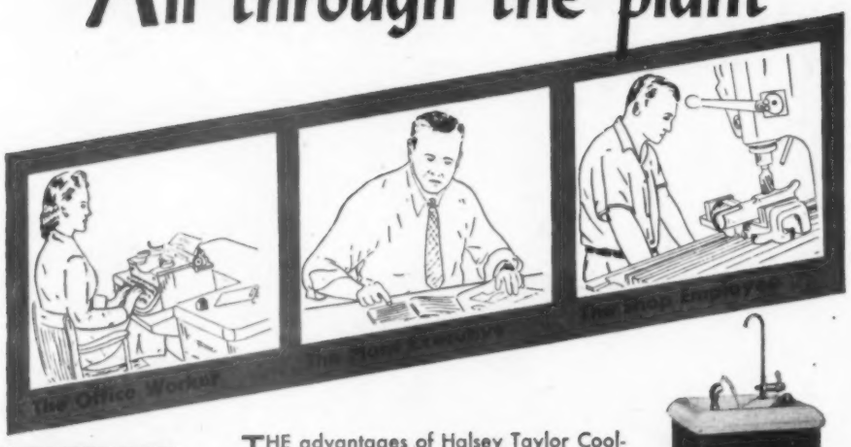

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EFFICIENCY VS PROFICIENCY IN PURCHASING—ROCHESTER

Stuart F. Heinritz, editor of PURCHASING Magazine, New York, was the principal speaker at the January 8th meeting of the Rochester. Association of Industrial Buyers, at the Normandie Hotel, Rochester, N. Y. He discussed the subject "Efficiency Versus Proficiency in Purchasing."

In the course of his talk he stated that measuring the efficiency of the Purchasing Department has long been a problem of management, because management is cost conscious. He said that though many executives have advanced theories as to the method of measuring purchasing department efficiency, a suitable answer is yet forthcoming, and that though job analysis is a popular subject, there are so many intangibles so far as the Purchasing department is concerned that establishment of a sound basis of appraisal is still illusive. He stated that the cost of the operation of a department is small compared to the money it spends.

Among the ways in which the purchasing department can assist management, he suggested the formulating of product cost budgets, and assisting engineering with specifications so that products can be obtained from standard producers, making for lower cost and better delivery. This would also assist the quality control department, leading to reduced labor costs, and the holding of rejections to a minimum.

The speaker declared that it was essential that buyers be familiar with production processes and the end use of the product, and also that they be familiar with suppliers manufacturing methods and facilities.

He also declared that it is quite desirable that the purchasing agent be active in management discussions not only relative to the functions and personnel of the purchasing department, but also in regard to the operations and functions of other departments.

An efficient department, he stated, can perform its duties perfectly satisfactory to management. However, this does not mean that it is proficient. To be proficient as well as efficient, it is necessary that the buyer look beyond the purchasing function in an effort to be of additional service to the company by working with engineering and others to obtain efficiency in production, better quality and lower cost of end product.

* * *

POST WAR PURCHASING PITTSBURGH MEETING

R. L. Van Cleve, Director of Purchases, Carnegie-Illinois Steel Corporation, Pittsburgh, Pa., spoke on "Post War Purchasing" at the January 21st meeting of the Purchasing Agents Association of Pittsburgh, at the Hotel William Penn, Pittsburgh, on January 21st. Mr. Van Cleve was one of the principal speakers at the annual convention of the National Association in Chicago last year.

(*Please turn to page* 268)

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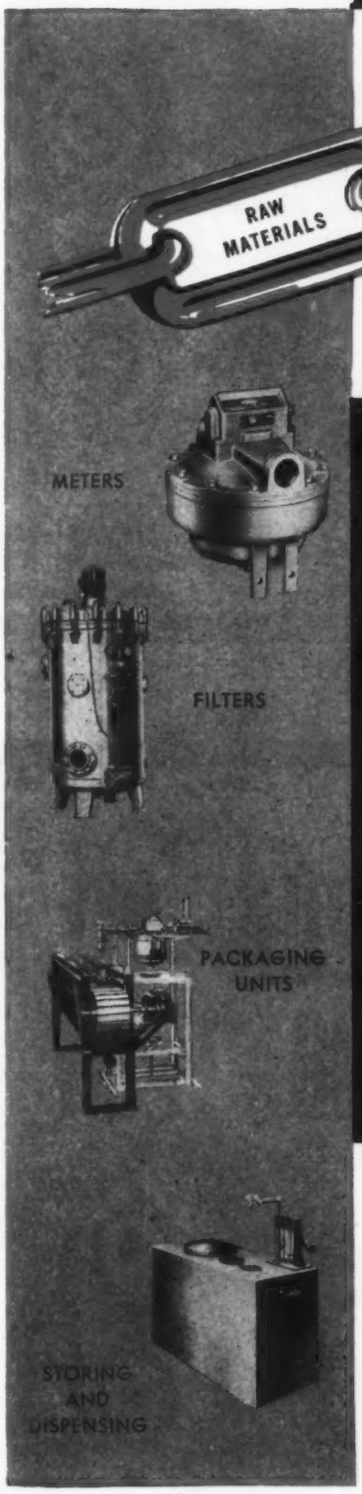

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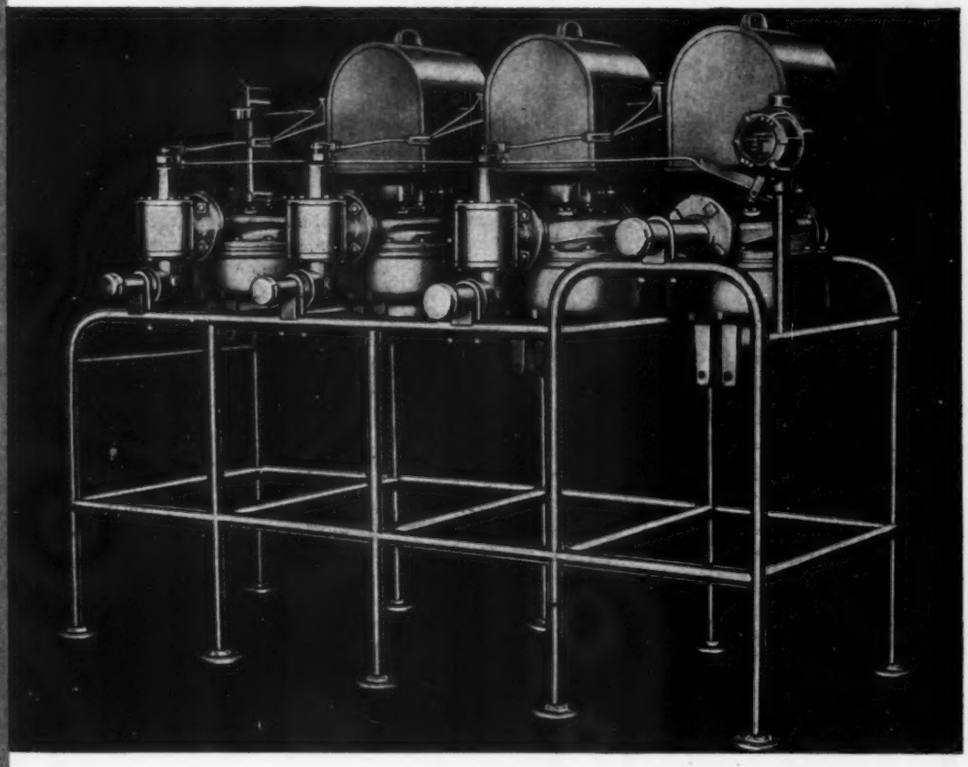

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WARTIME RADAR DISCUSSED MONTREAL ASSOCIATION

W. S. Emery, Superintendent of Communications, Canadian Pacific Railways, was guest speaker at the meeting of the Purchasing Agents Association of Montreal, January 21, at the Mount Royal Hotel, Montreal, Canada. Mr. Emery's subject was "How Radar Helped to Win the War".

Garnet T. Dickson, vice-president, District No. 5 of the N.A.P.A. and president of the Council of Canadian Purchasing Agents Associations, delivered a short address on the activities of the Canadian Council. Earlier in the afternoon numerous members of the association visited the Charles E. Frosst & Company plant in Montreal.

NEW YORK PURCHASING INSTITUTE PLANS COURSE ON CONTRACTS

Chairman Stanley W. MacKenzie of the educational committee of the Purchasing Agents Association of New York, is completing plans for a six week course dealing with various phases of one subject, Contracts, to commence in March. Mr. MacKenzie is director of Purchases, U. S. Rubber Company, New York.

A qualified expert on contracts will present the subject in non-legal language, from a practical point of view, to be followed by a discussion of specific problems presented by members participating. The course will be confined to members of the association, with enrollment limited to 40.

DISCUSS STEEL AT COLUMBUS

William M. Rooney, news and market editor of the Penton Publishing Company, Cleveland, Ohio, spoke on "Steel Supply Outlook for 1947", at the January 13th meeting of the Purchasing Agents Association of Columbus, held at the Fort Hayes Hotel.

QUIZ PROGRAM FEATURES MEMPHIS MEETING

Following a talk by Walter Durham, reporter for the *Commercial Appeal* of Memphis, about his experiences as a newspaper man in various parts of the country, a quiz program featured the January dinner-meeting of the Purchasing Agents Association of Memphis, Tenn., in which each member gave his opinions on the following possibilities: (1) Prices would decline, increase or remain unchanged for 1947; (2) Sales of products would decline, increase or remain unchanged; and, (3) Inventories of such products would increase, decline or remain unchanged. A majority reported that they expect price decreases in the goods they purchase, and also expressed the belief that both inventories and sales of the companies they represent will increase in 1947.

(*Please turn to page 270*)

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Spring WASHERS

Bolted assemblies *stay* TIGHT *permanently*

BEALL SPRING WASHERS, with live, long-range action compensate for ALL causes of looseness including vibration, bolt stretch, wear, rust and break-down of finish under the nut and bolt head.

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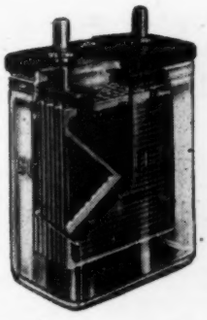
Hockey goalies are prepared for jolts and bruises. Similarly, Gould Plante Batteries are designed to meet all the shocks and strains of the high discharge rates met in standby and control operations. In this service they have out-performed and outlasted all other types of batteries.

and here is the Reason why . . .

The two outer negative plates in each Gould Plante Battery are of special construction. They are barricaded with alternate horizontal narrow openings and broad solid sections of heavy lead. This strengthens the entire element against warping and distortion, and effectively prevents over-expansion and loss of useful active material.

For 15 years no adjustments have been made on Plante Batteries because of premature failure. Get the facts. Write Dept. 22 for Catalog 1000 on Gould Sealed-in-Glass Batteries for Stationary Applications.



GOULD Plante' BATTERIES

GOULD STORAGE BATTERY CORPORATION, Depew, N. Y. Service Centers: Atlanta • Boston • Buffalo • Chicago • Cincinnati • Cleveland Detroit • Kansas City • Los Angeles • New York • Philadelphia • Pittsburgh • St. Louis • St. Paul • San Francisco • Seattle • Zanesville

Gray Iron
CASTINGS
S.A.E. or A.S.T.M.
Specifications
Class 20 • Class 30
Class 40

Special Facilities
for Rollover — Cope-and-drag production to 150 pounds

Other castings up to 1000 pounds

THE
FOREST
CITY
FOUNDRIES CO.
Member Gray Iron Research Institute
2500 West 27th St.
Cleveland 13, Ohio
PHONE PRospect 5040

WOMEN IN BUSINESS—ALABAMA ASSOCIATION

The subject of "Women in Business" was presented to the Purchasing Agents Association of Alabama by four women members of the association at a luncheon meeting at the Thomas Jefferson Hotel, Birmingham, Ala., on the 9th of January.

Sara M. Morgan, purchasing agent, William E. Mathews Co., presided over the meeting and introduced the speakers. Luise Capps, purchasing agent, Crest-Tex Mills, Inc., spoke of the need for mutual respect between buyers and sellers and recommended the textile field as a career for young women, pointing out its unlimited opportunities in its many phases of manufacturing, printing, finishing, designing and marketing. Bernice Cohron, purchasing agent, Jefferson-Hillman Hospital, spoke on "What the Purchasing Agents Association Has Meant to Me", giving the members credit for being very helpful to her on many occasions and in helping her to reach decisions in her own work as well as learn to respect the opinions of others.

Martha Swafford, purchasing agent, Alabama Gas Co., presented some of the facts and historical information on what women have accomplished in the business world. She cited numerous individual accomplishments of women in professional and business fields as well as politics and science, stating that women are engaged in 537 of the 572 recognized professions. Mrs. Morgan closed the program by summing up the problems that women face today in holding important jobs in industry.

Left to right: Mrs. Sara Morgan, Miss Martha Swafford, Mrs. Bernice Cohron, Mrs. Luise Capps.

ECONOMIC OUTLOOK FOR 1947 WASHINGTON, D. C. ASSOCIATION

Dr. Louis J. Paradiso, Chief, Business Structure Division, Office of Business Economics, Department of Commerce, was the guest speaker at the meeting of the Purchasing Agents Association of Washington, D. C., January 14 at the Mayflower Hotel. Dr. Paradiso spoke on the "Factors in the Economic Outlook for 1947". Educational sessions on practical purchasing problems were resumed Monday January 20th. C. Irving Hansen has resigned as president of the association and A. W. Hawkins, vice-president, will serve as president until the election of officers in May, 1947.

A. J. BROWNING TO ADDRESS PURCHASING-SALES-EXECUTIVE DINNER OF NEW YORK ASSOCIATION

A. J. Browning, vice president in charge of purchases, Ford Motor Company, will be the principal speaker at the Annual Purchasing-Sales-Executive Dinner of the Purchasing Agents Association of New York, which is scheduled to be held at the Hotel Commodore, New York, Wednesday, February 26th. A commentary by George A. Renard, secretary-treasurer of the N.A.P.A. will supplement Mr. Browning's address. The dinner is being arranged by the program committee, Harold Butterfield, chairman, in cooperation with the dinner committee, E. G. Jaehne, chairman.

SHELDON

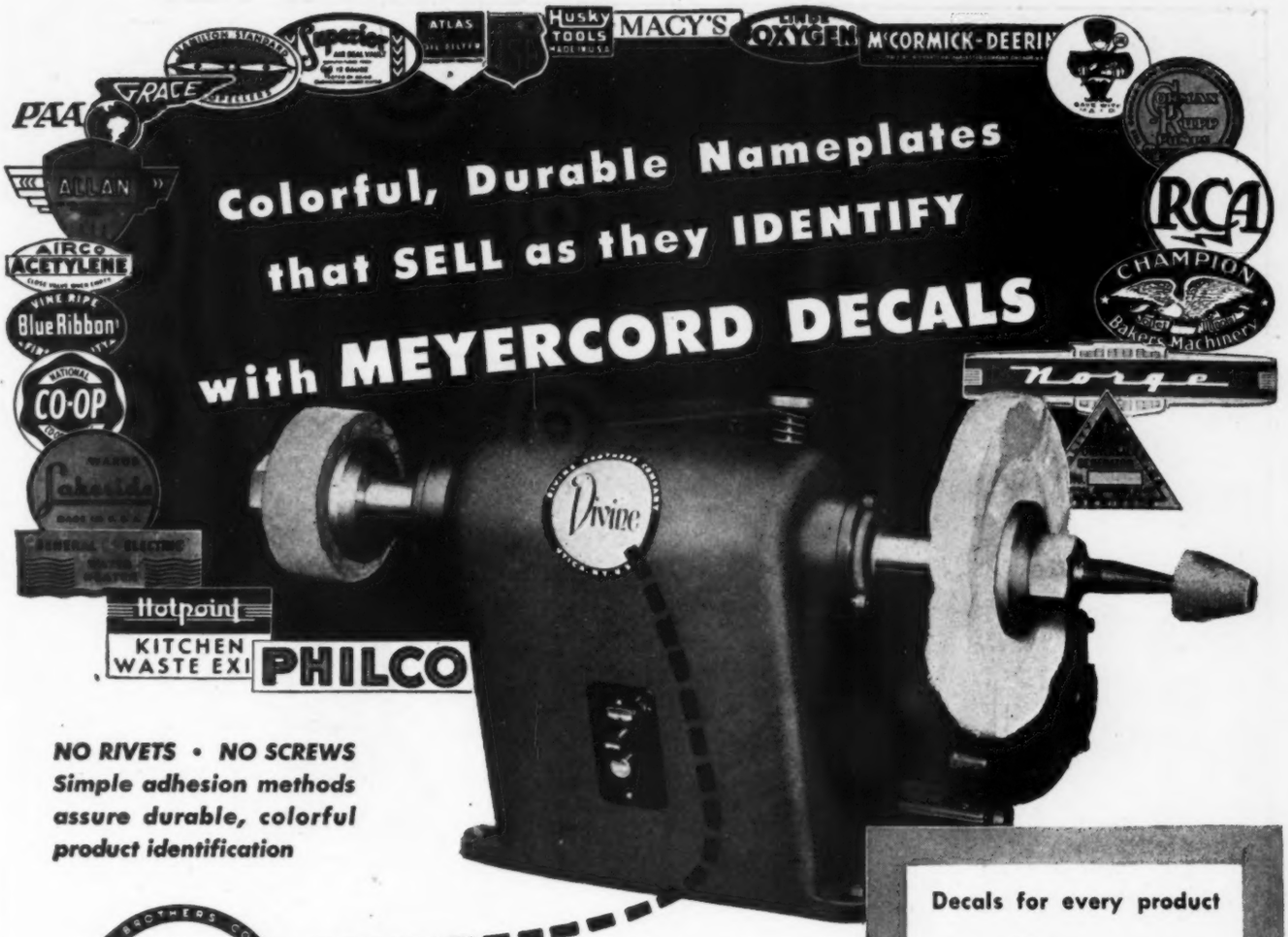
Horizontal Milling Machine

Rigidly built for continuous heavy-duty precision service. Spindle supported in double row Timken Taper Roller Bearings. Fully enclosed variable drive, choice of two spindle speed ranges, 100 to 1000 or 125 to 1350 r.p.m. Taper gibs thruout.

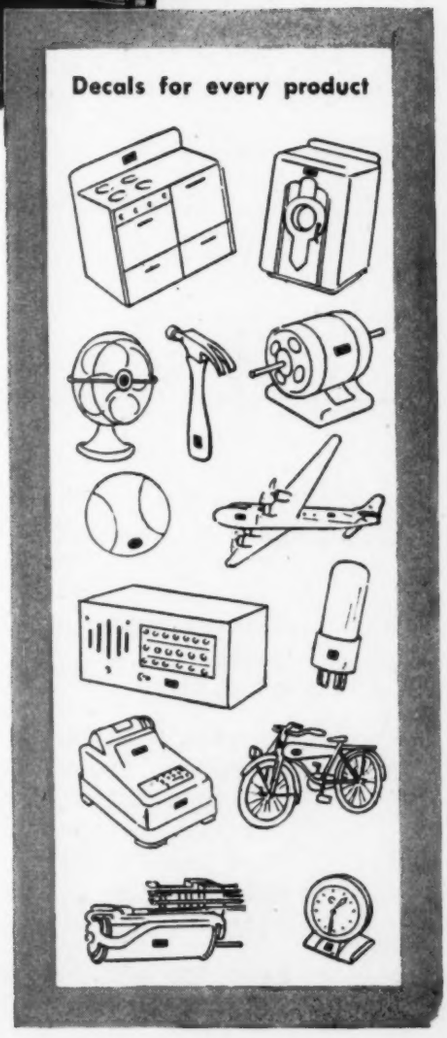
Write for circular

SHELDON MACHINE CO., INC.
4253 N. Knox Ave. Chicago 41, U. S. A.

Colorful, Durable Nameplates that SELL as they IDENTIFY with MEYERCORD DECALS



NO RIVETS • NO SCREWS
Simple adhesion methods assure durable, colorful product identification



Conditions under which this "Divine" buffer operates demonstrate Meyercord quality.

Double-duty, low-cost Meyercord Decal nameplates *advertise* as they *identify*. They offer full color for quick brand recognition! Divine Brothers Co., Utica, N.Y., has used them for years as trademarks of colorful distinction on quality buffing wheels. They resist vibration, fumes, moisture, abrasion, acids, wear and constant use.

Advertise *your* brand-name for the life of *your* products with tough, flexible Meyercord Decals! They can be applied at production line speeds. No screws, rivets... no sharp edges. Washable, durable! Smooth, lasting adhesion on any commercial surface, curved or flat... even on rubber or crinkle finish. Trademarks, operating or lubrication guides, patent data, etc., can be produced in any size, colors, designs. Learn how Meyercord Decals add more "sell" to nameplates! Write today for free Meyercord Decal Selector... it shows where and how to use Decals. Address Dept. 61-2

Founder-Member Lithographic Technical Foundation

The MEYERCORD Co.
World's Largest Decal Manufacturer
5323 W. LAKE ST. ---------- CHICAGO 44, ILL.

DO YOU LOOK FOR EXTRAS IN THE PAPER YOU BUY?

To be out of the ordinary, business papers, like anything else, need those extra special characteristics of quality that give constant satisfaction. And it's a smart paper buyer who knows that, in the long run, "extras" cost less and are a bargain in value.

Eastern's Atlantic line is a broad, accepted line of business papers that offers all the extras you want in uniformity, printability, and dependability. Fine papers for better results, they give satisfaction...constant satisfaction to everyone who uses them.

Send for our portfolio of samples today.

EASTERN'S
Atlantic Bond
MADE BY
EASTERN CORPORATION
BANGOR, MAINE

PRODUCTION EXECUTIVE

Office Equipment and Supplies

Monthly FORMS FORUM

Simple System that Amply Meets Needs
Only Four Forms Used

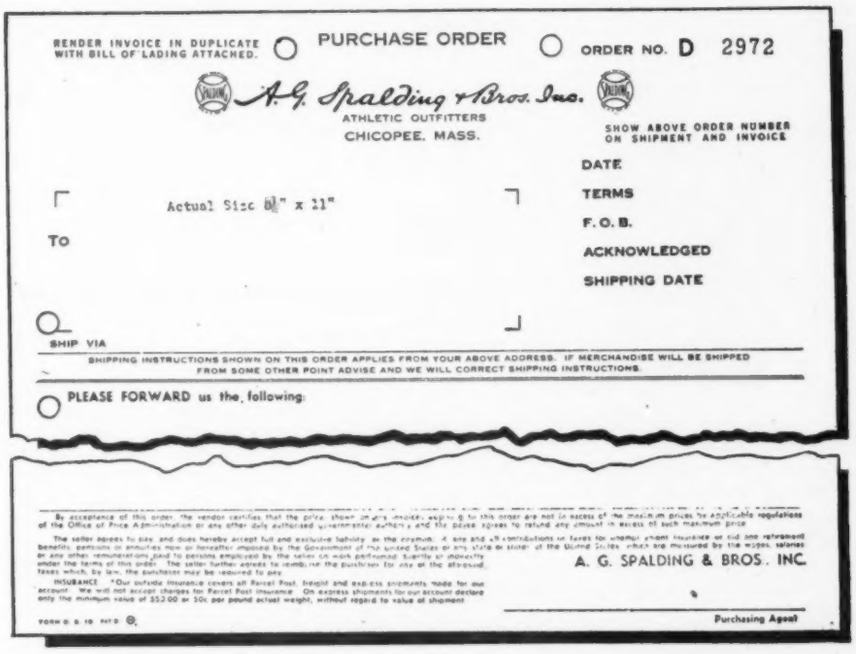
INCIDENT to supplying the accompanying forms for use in the Forum, Purchasing Agent R. W. Fleury of A. G. Spalding & Bros. Inc., athletic goods, Chicopee, Mass., states that it is the policy of his department to avoid as much as possible keeping records that later are only histories. "What has happened in the past", he writes, "is water over the dam, and our records and plans are set on future business.

"Early in June we set up our production schedules for the next year which starts with us November 1st. Our purchases are made and scheduled accordingly to fit in with our production schedule, our object being to maintain inventories, if possible, of not more than three months, with some exceptions.

Monthly Check

"Monthly these inventories are checked with our deliveries and production schedules so as to enable us to take advantage of any conditions that may arise. As a

(*Continued on page* 274)



RENDER INVOICE IN DUPLICATE WITH BILL OF LADING ATTACHED. ○ PURCHASE ORDER ○ ORDER NO. D 2972

A. G. Spalding & Bros. Inc.
ATHLETIC OUTFITTERS
CHICOPEE, MASS.

SHOW ABOVE ORDER NUMBER ON SHIPMENT AND INVOICE

Actual Size 8½" x 11"

TO

DATE
TERMS
F. O. B.
ACKNOWLEDGED
SHIPPING DATE

SHIP VIA

SHIPPING INSTRUCTIONS SHOWN ON THIS ORDER APPLIES FROM YOUR ABOVE ADDRESS. IF MERCHANDISE WILL BE SHIPPED FROM SOME OTHER POINT ADVISE AND WE WILL CORRECT SHIPPING INSTRUCTIONS.

○ PLEASE FORWARD us the following:

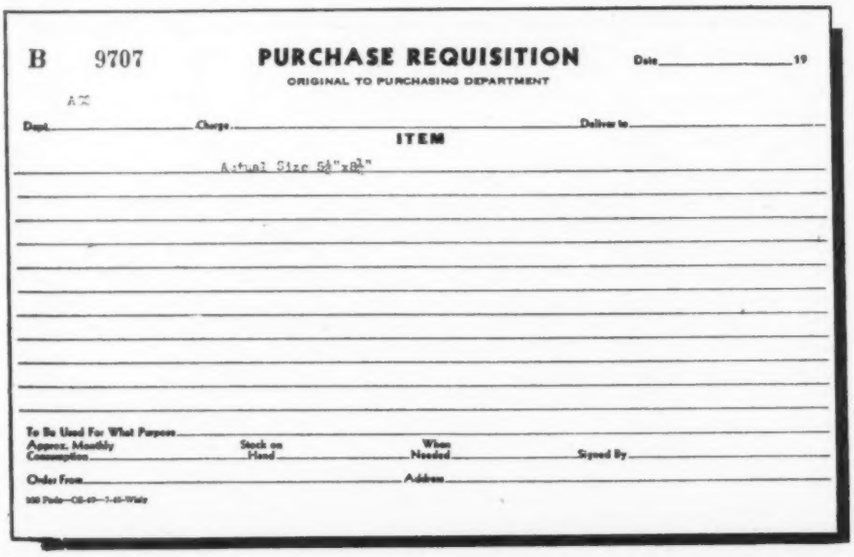
By acceptance of this order, the vendor certifies that the price shown on its invoice, subject to this order are not in excess of the maximum prices as applicable regulations of the Office of Price Administration or any other duly authorized governmental authority and the vendor agrees to refund any amount in excess of such maximum price.

The seller agrees to pay, and does hereby accept full and exclusive liability for the payment, if any and all contributions or taxes for unemployment insurance or old age retirement benefits, pensions or annuities now or hereafter imposed by the Government of the United States or any state or states of the United States which are measured by the wages, salaries or any other remunerations paid to persons employed by the seller on work performed directly or indirectly under the terms of this order. The seller further agrees to reimburse the purchaser for any of the aforesaid taxes which, by law, the purchaser may be required to pay.

INSURANCE *Our outside insurance covers all Parcel Post, freight and express shipments made for our account. We will not accept charges for Parcel Post insurance. On express shipments for our account declare only the minimum value of $52.00 or 50¢ per pound actual weight, without regard to value of shipment

A. G. SPALDING & BROS. INC.

Purchasing Agent



B 9707 **PURCHASE REQUISITION** Date _____ 19

ORIGINAL TO PURCHASING DEPARTMENT

Dept. _____ Charge _____ Deliver to _____

ITEM

Actual Size 5½"x8½"

To Be Used For What Purpose _____

Approx. Monthly Consumption _____ Stock on Hand _____ When Needed _____ Signed By _____

Order From _____ Address _____

In addition to clause covering taxes for unemployment insurance, retirement benefits, etc., the purchase order also carries insurance clause on incoming shipments.

• • •

The purchase requisition indicates material use, shows approximate monthly consumption, and reports stock on hand.

SALES PERSONNEL CHANGES ANNOUNCED BY OLD TOWN

In connection with its program of increased promotion activities for 1947, the Old Town Ribbon and Carbon Co., Inc., of Brooklyn, New York, has undertaken an expansion of its sales force, according to announcement by A. W. Young, vice-president and general manager.

R. Oppenheim

Rudolph Oppenheim becomes Western Sales Manager for the firm, with supervision of the territory from Denver West. Mr. Oppenheim will make his headquarters in Los Angeles.

R. V. Barlow

Robert V. Barlow has been appointed factory representative for the states of Michigan and Ohio. With many years of experience in the office machine and supply business, Mr. Barlow recently completed a training course in the Old Town plant and is now traveling in the territory.

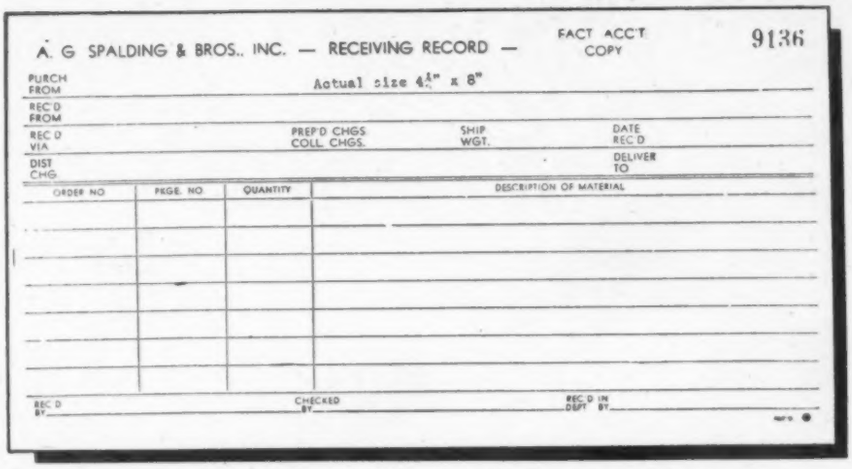
R. W. Goode

Old Town interests in New England will be represented by Richard W. Goode, who will operate from the City of Boston.

Pittsburgh-Minneapolis

Philip D. May, with offices in the Commercial Building, Pittsburgh, has been appointed to distribute Old Town products in the Pittsburgh area, while D. C. Hey, 417 Sixth Street South, Minneapolis, will handle sales in the Twin Cities.

 (*Continued from page 273*)


A. G SPALDING & BROS., INC. — RECEIVING RECORD — FACT ACCT COPY 9136

PURCH FROM — Actual size 4¼" x 8"

REC'D FROM

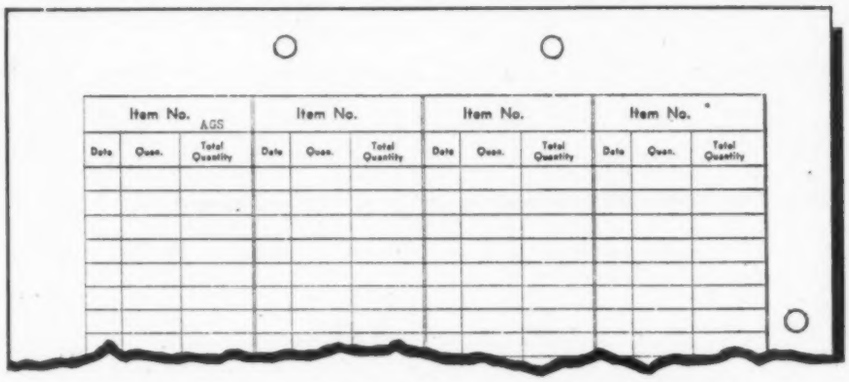
REC'D VIA — PREP'D CHGS. COLL. CHGS. — SHIP WGT. — DATE REC'D

DIST CHG — DELIVER TO

ORDER NO.	PKGE. NO.	QUANTITY	DESCRIPTION OF MATERIAL

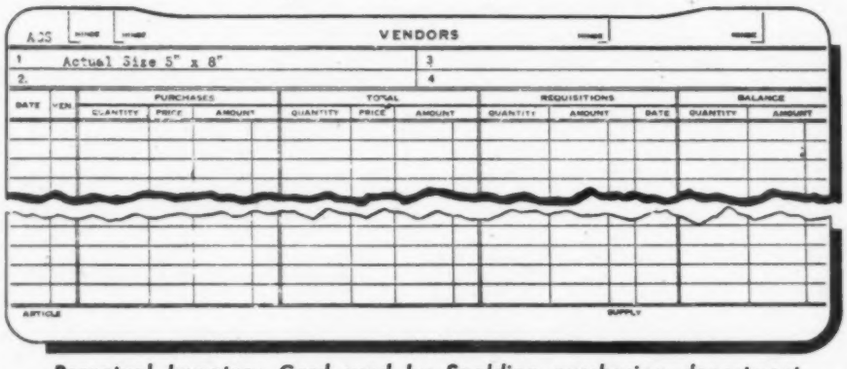
REC'D BY — CHECKED BY — REC'D IN DEPT. BY

Incoming shipments are reported on Receiving Record


Item No. AGS | Item No. | Item No. | Item No.

Date	Quan.	Total Quantity	Date	Quan.	Total Quantity	Date	Quan.	Total Quantity	Date	Quan.	Total Quantity

Reverse of purchasing department copy of purchase order


AGS — VENDORS

1 Actual Size 5" x 8" — 3

2. — 4

DATE	VEN.	PURCHASES QUANTITY	PRICE	AMOUNT	TOTAL QUANTITY	PRICE	AMOUNT	REQUISITIONS QUANTITY	AMOUNT	DATE	BALANCE QUANTITY	AMOUNT

ARTICLE — SUPPLY

Perpetual Inventory Card used by Spalding purchasing department

whole this has worked out very satisfactorily.

"The majority of our direct material purchases originate in this office; however, miscellaneous items are requisitioned through the Purchasing Department on the Purchase Requisition. Purchase order is made out, and as materials are received they are immediately covered by our Receiving Record. Stock record is maintained on Perpetual Inventory Card also enclosed.

"The above mentioned are the only forms used in the operation of purchasing. They may appear scanty, but cover our needs amply."

The Purchase Order comprises seven copies in the following color scheme: White, vendor; green, purchasing department; blue, receiving department; pink, department copy; yellow, statistical copy; orange, office copy; ivory, traffic department.

The provisions at the bottom of the sheet contain an insurance clause which reads as follows: "Our outside insurance covers all Parcel Post, freight and express shipments made for our account. We will not accept charges for Parcel Post Insurance. On express shipments for our account declare only the minimum value of $50.00 or 50c per pound actual weight, without regard to value of shipment."

(*Please turn to page 276*)

NOW AVAILABLE FOR PROMPT DELIVERY

Automatic feed, hand-operated Mimeograph brand duplicators

MIMEOGRAPH BRAND DUPLICATOR, MODEL 90. Ideal for the smaller school, the growing business . . . for churches, chain stores, branch offices everywhere. Simple and easy to use. Free instruction. Handsome efficiency, popular price.

MIMEOGRAPH BRAND DUPLICATOR, MODEL 91. General purpose, medium price. Closed cylinder. Turns out those clear, easy-to-read, low-cost, black-and-white copies by tens or hundreds, as you want them. Easy to use color, too.

The Mimeograph brand duplicator

IS MADE BY
A. B. DICK COMPANY, CHICAGO

MIMEOGRAPH is the trade-mark of A. B. Dick Company, Chicago, registered in the U. S. Patent Office.

COPYRIGHT 1947, A. B. DICK COMPANY

A. B. DICK COMPANY, Dept P-247
720 West Jackson Boulevard, Chicago 6, Illinois

☐ Place my order for_____Model_____Mimeograph brand duplicator with the distributor nearest me.

☐ Have a salesman call.

☐ Send me more information on Model_____.

NAME.....

ORGANIZATION.....

ADDRESS.....

CITY.....STATE.....

COMMERCIAL FORMS AND SYSTEMS

An ally of modern management, Reynolds and Reynolds *is* one of the world's largest suppliers of printed or lithographed control and operational forms.

- CARBON INTERLEAVED SYSTEMS
- BUSINESS MACHINE FORMS
- PAYROLL CHECKS and SYSTEMS

Effective Advertising Literature, Distinctive Stationery and Business Forms of every kind

The REYNOLDS & REYNOLDS

COMPANY • DAYTON 7, OHIO

Established 1866

SALES OFFICES IN MANY PRINCIPAL CITIES

(*Forms Forum—Continued on page 274*)

Two Receiving Reports

HERE are two types of receiving reports, one a Storekeeper's Receiving Report used by the Pennsylvania-Dixie Cement Corporation, and a Material Received Report which is used by the Acme Brick Company.

The latter carries a column for indicating where the material has been "Placed at Plant", and also calls for information as to how the material is to be charged.

There is also reproduced a simple monthly Supplies Inventory form used by the Acme Brick Company.

PENNSYLVANIA-DIXIE CEMENT CORPORATION

STOREKEEPER'S RECEIVING REPORT

PLANT No. _____ DATE _____ 194__

RECEIVED FROM

No. AND CLASS OF PACKAGES ORDER No.

CARRIER

WEIGHT	FREIGHT RATE	PRO. NUMBER	FREIGHT BILL PASSED	INVOICE PASSED

QUANTITY	SIZES	DESCRIPTION
		Actual Size 5-1/2" x 8-1/2"

Attach This Copy To Original Invoice

CHECKED BY _____ APPROVED _____ Storekeeper

Report is attached to original invoice

ACME BRICK COMPANY
TULSA, OKLAHOMA

MATERIAL RECEIVED REPORT T No. 0001

RECEIPT OF MATERIAL

Shipper's Name _____ Car Initials _____ No. _____

Shipment From Actual Size 8" x 9" Exp. Bill Date _____ No. _____

Transportation Method _____ Terms _____ Collect Charges _____

QUANTITY	COMMODITY	WEIGHT	WHERE PLACED AT PLANT	CHARGE TO

Date Received _____ Order No. _____

REMARKS: RECEIVED, EXAMINED AND FOUND O. K. EXCEPT AS NOTED.

This is combined Receiving and Inspection Report

SUPPLIES INVENTORY FOR _____ PLANT MONTH ENDING _____ 194__

QUANTITY	DESCRIPTION	PRICE	EXTENSIONS
	Actual Size 8½" x 11"		

Monthly Supplies Inventory Report used by Acme Brick Company, Tulsa, Okla.

Your Office Boy is a Qualified REPAIR EXPERT ON PERMAPOINT

Because ANY and ALL WEAR or ACCIDENTAL POINT-DAMAGE can be IMMEDIATELY FIXED by simply inserting a thrifty RENEWAL UNIT (the 4-in-1 assembly of the complete "works" of the pen)! And anyone can do it—anywhere—anytime.

Permapoint, the Eberhard Faber guaranteed, long-service Fountain Pen is a "buy" at $1.50 (single pen list price). There's a point for every hand, broad, medium, fine and extra fine. Every point is tipped with Iridium*, a satin-smooth precious alloy that has all the wear resistance of pens costing several times as much. From a company-purchase point of view, Permapoint is inexpensive, yet practical... consider the RENEWAL feature. Your supply dealer will be glad to give you a full demonstration.

Thrifty Renewal Unit No. 1203 (consists of point, feed, section and sac) lists singly at

35¢

HEAVY
MEDIUM
LIGHT
EXTRA LIGHT

Trade name... over 40% platinum and osmium content.

EBERHARD FABER

LEADERSHIP IN FINE WRITING MATERIALS SINCE 1849

Here's all you need to know

About Paper for Records and Correspondence

IF IT'S A WESTON PAPER — made by Byron Weston Company — it is a *cotton fibre paper.*

IF IT IS A COTTON FIBRE PAPER — made wholly or in part of strong, durable cotton fibres, it has the appearance, endurance and excellent working qualities so essential to paper for important business records and correspondence.

EVEN IF IT COSTS MORE than you have been paying — paper is such an infinitesimal item in the cost of doing business that you can not afford to entrust important records and correspondence to anything but the best.

Ask your printer, stationer or paper merchant to supply Weston Papers precisely adapted to the varying life and service needs of your business records and forms and for letterheads that carry important correspondence and information worth keeping.

BYRON WESTON COMPANY, Dalton, Massachusetts

Use WESTON Papers for RECORDS like these

ACCOUNTING FORMS
CONTRACTS
COST RECORDS
CREDIT FORMS
FINANCIAL REPORTS
INVESTMENT RECORDS
LOOSE LEAF FORMS
MINUTE BOOKS
PERSONNEL RECORDS
PROPERTY RECORDS
REGISTERS
REQUISITIONS
SALES RECORDS
STOCK RECORDS

Weston Makers of Papers for Business Records

AUTOMATIC TYPEWRITER OPERATED BY PNEUMATIC MECHANISM

An automatic typewriter, operated by a new pneumatic mechanism, has been announced by Robotyper Corporation, 18050 Ryan Road, Detroit 12, Michigan. The machine, Model ER Robotyper, enables one typist to turn out hundreds of individually-typed letters daily, varying as to addresses and filled-in details.

The Robotyper operates on the vacuum principle. Its mechanism is controlled by a master record, perforated like a player-piano roll. The roll operates the keys in the same manner as a typist, and so it performs any typing that an individual stenographer can do, including underlining, line spacing, tabulating and shifting for capitals. The roll also permits convenient, permanent filing for later use. Any letter once typed on the Robotyper can be used again and again.

Girl and three machines illustrating Robotyper operating two auxiliaries

The Robotyper is compact, measuring only 19 by 26 inches, and one of its greatest advantages is installation, or removal for servicing, in two minutes. It can be used with any make of electric typewriter. The Model ER Robotyper is so constructed that as many electric typewriters as desired can be hooked together for simultaneous operations off one master record roll.

Among the correspondence that Robotyper can handle speedily and accurately are direct mail campaigns, letters of credit, letters of policy, price lists, letters to dealers and jobbers, and even forms, postcards and address stickers.

Letters are personalized with Robotyper. It is adjustable for automatic stops, standing idle until the operator fills in names, dates, amounts, or any other desired material. Similarly, paragraphs may be changed, inserted or omitted anywhere in the body of the letter. The new ER Robotypers can be so arranged that as the typist fills in the heading of a letter, another machine simultaneously addresses the envelope.

In conjunction with the Robotyper, auxiliary units may be used. This is a means by which two or more electric typewriters may be coupled together to obtain unison operation either manually or automatically.

(*Please turn to page* 280)

When your Sales or Advertising Department wants *Catalog Covers*

Here's your Answer!

This new **NATIONAL** Loose Leaf Cover Catalog is a real handbook for purchasing men . . . to help produce better catalogs, price lists, portfolios and manuals.

FILL IN AND SEND THIS COUPON FOR YOUR COPY TODAY

NATIONAL BLANK BOOK COMPANY
HOLYOKE, MASSACHUSETTS
New York • Boston • Chicago • San Francisco

Yes, I want my files up-to-the-minute on Loose Leaf Catalog Covers. Send a catalog to.

.....

.....

.....

Be *"paper-minded"* about your letterhead!

A striking looking letterhead requires *fine paper* no less than a *good design*. Art work, modern type and color—use *all* to make your correspondence work harder . . . but add the *crackle of quality* that Fox River paper sings out every time your customer handles a letter from you! This is Fox River's 64th year of making cotton fibre papers (the more cotton fibre the finer the paper). Every sheet plainly watermarked, as explained below, so you can easily choose the correct grade to fit every business paper need. Ask your printer. FOX RIVER PAPER CORPORATION, 403-B S. Appleton Street, Appleton, Wisconsin.

Bond, Ledger and Onion Skin Papers

OUR WATERMARK is your quality guarantee

Look *through* the paper... see all three!

1 COTTON FIBRE

2 25-50-75 or 100% COTTON FIBRE CONTENT

3 MADE "by FOX RIVER"

LEWIS APPOINTED SPECIAL ROYAL SALES REPRESENTATIVE

W. H. Lewis, formerly with the Royal Typewriter Company's Portable Division, has been transferred to the sales department as a special representative, under the direction of Sales Manager D. B. Starrett. Discharged about a year ago from the Navy, in which he served as a lieutenant commander, Lewis returned to Royal as portable district representative for Michigan, parts of Indiana, and Ohio, where he operated prior to his enlistment in 1942.

BOOK ON NEW TRADE MARK ACT

Book on the new trade-mark act, bearing the title "Trade-Mark Act of 1946", H. A. Toulmin, Jr., Dayton, Ohio, author, is announced by the W. H. Anderson Company, law book publishers of Cincinnati, Ohio. The act, known as the Lanham Act, is characterized as the first comprehensive law enacted for the protection of trade-marks in the United States. Under the new law many types of trade-marks which could not be successfully protected are now susceptible of protection, such as secondary meaning marks, service marks, certification marks and distinctive package designs.

A unique feature of the trade-mark law is the provision for separate registers. In addition to the principal and supplemental registers, the Commissioner of Patents may establish separate registers for foreign marks, service marks and collective and certification marks.

One of the most vital features of the new trade-mark law is that after a period of years a mark becomes incontestable and is the property without question of the owner. Heretofore, the registration of a trade-mark was only evidence of a claim to the mark. New grounds for cancellation are if the mark becomes the common descriptive name of a product or if the mark is being used to violate the anti-trust laws.

The price of the book is $5.00.

NEW COATED-UPHOLSTERY FABRIC FLEXIBLE, DURABLE

Terson is the name of new coated fabric developed by the Athol Manufacturing Co., Athol, Mass., designed primarily to meet the requirements of the upholstery field. Terson is made by a process whereby the synthetic resin coating is applied to a woven fiber base of heavy cotton, and then baked on by infra-red light. The fabric is made in popular colors and leather grains. It is said to be waterproof, slow burning, and can be made mildewproof and fireproof if required. Maker says it will not crack or chip. It can be cleaned easily with a damp cloth. It is recommended for wide upholstery usage—office furniture, household furniture, public auditorium seating, bus, railroad and airplane seats, and also for covering garden furniture.

WATER COOLER STANDARD

U.S. Department of Commerce, National Bureau of Standards, announces that Self-Contained Mechanically Refrigerated Drinking-Water Coolers, Commercial Standard CS127-45, has become effective for new production as of February 1, 1947.

MAGNETIC TAPE RECORDER

A new magnetic tape recording machine for commercial, home and industrial uses, has been developed by Indiana Steel Products Company, Chicago, Ill., in collaboration with the Physics Research Division of the Midwest Research Institute, Kansas City, Mo. The recorder is available in a portable self-contained

Drawer Model Tape Recorder

unit providing both recording and play-back facilities, which complete with carrying case weighs about 30 pounds, or in a "drawer" model which consists of a low, flat box serving as a base for almost any type table model radio. In this model the amplifier of the radio itself can be used for both recording and play-back, or the recording can be made with a simple low grain amplifier in the sound recording drawer. In use, a half-hour program can be recorded on a 7" reel for 8 mm. film, or a whole hour's program on a standard 16 mm. movie film reel.

Portable Tape Recorder provides recording and play-back facilities

The "Hyflux" tape, for whose application the recorder was designed, is the result of combined basic research in metallurgy, process metallurgy, organic and inorganic chemistry and process engineering. It is a paper tape coated with magnetic paint made from a metallic base powder as contrasted with other tape materials which are oxides. It is 1/4" wide and .002" thick (including the "Hy-

(*Continued on page 282*)

4-Second Loading

Precision engineered, sturdy Swingline stapler . . . with its exclusive wide open channel for quick, easy loading and trouble-free action . . .

SAVES TIME AND TEMPERS!

Swingline stapler and staples make the speediest, smoothest-acting stapling team in any office, factory, home or school!

SWINGLINE STAPLES

100% round wire for greater strength and penetration. Requires less glue, insuring perfect clog-free performance. Look for them in the red and blue box at your stationer's.

Swingline
STAPLERS AND STAPLES

IT STAPLES . . . IT TACKS . . . IT PINS

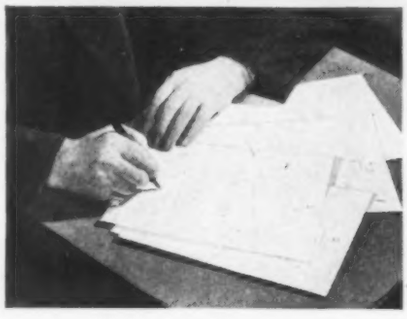
SPEED PRODUCTS COMPANY, INC., LONG ISLAND CITY 1, N. Y.

Revolutionary new system speeds office dictation!

1. Dictate . . . Flick the switch on your SoundScriber and "talk" your correspondence and memos! A wafer-thin, flexible disc catches every word, every shade of inflection, electronically. *You save time and money!*

2. Route . . . log sheet with transcribing instructions slips into SoundScriber Deskfolio along with disc and related correspondence. Seven-inch disc holds thirty minutes of dictation, is unbreakable. Deskfolio routes and handles as easily as a letter. *You save time and money!*

3. Transcribe . . . with precision and speed because of SoundScriber's radiolike clarity—its ease of operation. Convenient foot controls for instant start-stop and backspace. Unique SoundScriber Soft Speaker permits typist complete freedom of movement. *You save time and money!*



4. Mail . . . Your work is done quickly, correctly and efficiently due to SoundScriber clarity and convenient control. Recorded discs may be filed like letters. Routine memos and instructions need not be transcribed. *You save time and money!*

THOUSANDS IN USE — THOUSANDS OF USES

If you are not one of the thousands of users of SoundScriber Electronic Dictating Equipment, *now* is the time to get all the facts. The SoundScriber System will save you money. Many users say SoundScriber has paid for itself in a short time. Let us send you an actual SoundScriber disc to examine, to flex, to see how easily it handles and files. Get *all* the facts on SoundScriber, mail the coupon *now!*

First in Disc Dictation — First Electronic Dictating System

THE SOUNDSCRIBER Trade Mark CORPORATION, Dept. PC-2, New Haven 4, Connecticut

I'm interested. Send me *all* the facts.

NAME_____ COMPANY_____

ADDRESS_____ CITY_____ STATE_____

(*Continued from page* 280)

flux" coating of .0005"). Its break load is 6 pounds and it is said to provide excellent dimensional stability. Being of paper, the tape is easily cut or spliced for editing purposes, and written notations may be made on the reverse side, identifying specific message contents.

STATIONERY RACK FOR TYPISTS

Maso Steel Products, 418 S. Clinton Street, Chicago 7, Illinois, has introduced a new, efficient three tiered all steel tray for the use of typists. Made of welded sheet steel, the "On-R-Off" stationery rack provides three separate compartments for stationery or other typists materials and has a handy wire, catchfree hook which holds the rack firmly to Maso's No. 1418, 1618, 1620 and 1730 tables and stands. The "On-R-Off" is attached or removed in a jiffy and keeps the typist's supplies handy, convenient but out of the way. When attached to both sides of tables or stands, the On-R-Off provides the capacity of six drawers making a good substitute for a desk. The trays are in walnut finish, measure 12 x 9 inches, with 3 inches between trays.

"On-R-Off" Stationery Rack

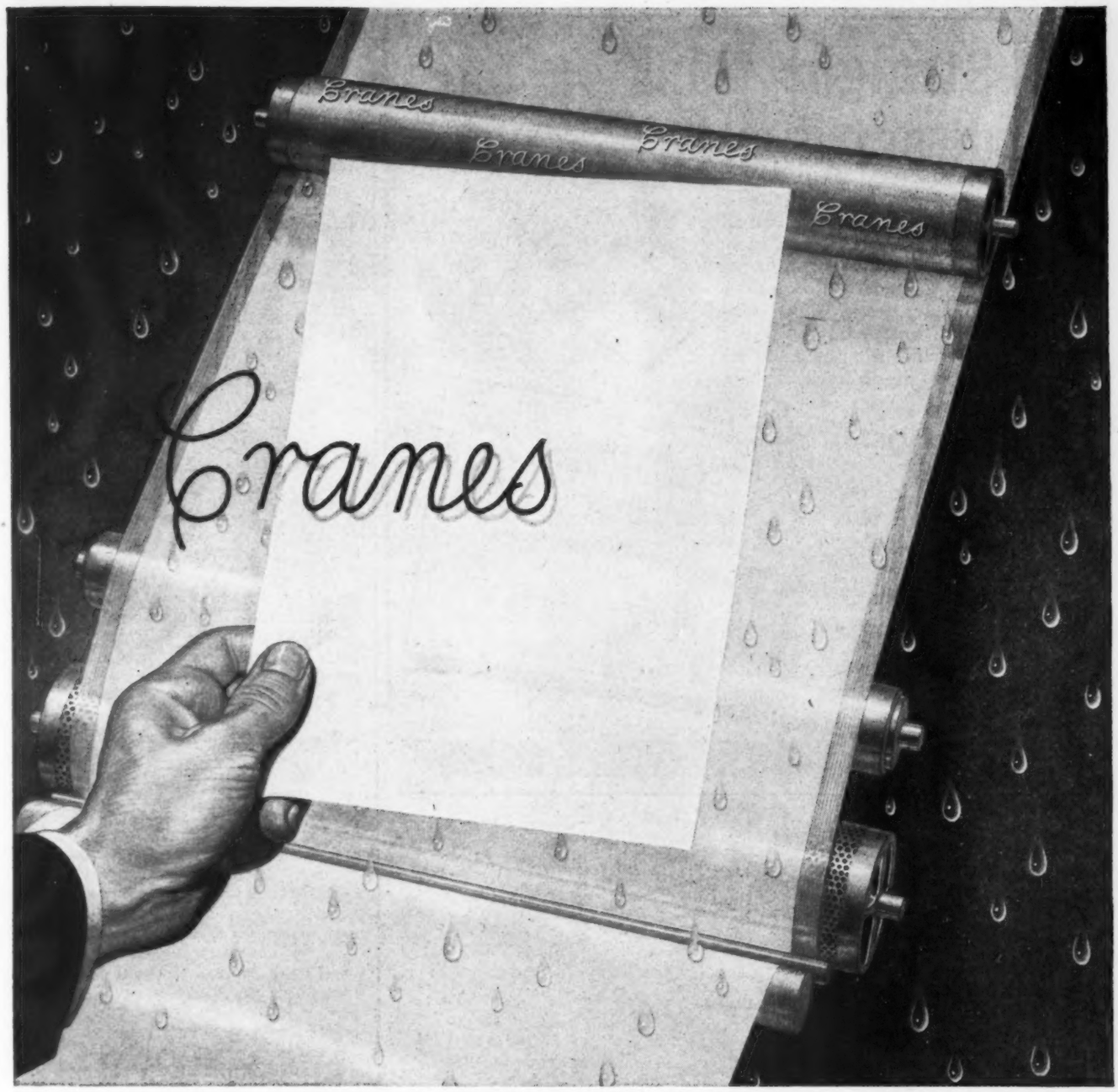
EXCELLENT BOOKLET ON FINE LETTERHEADS

"A Fine Letterhead is a Business Asset" is the title of an attractive, practical booklet available from the American Writing Paper Corporation, Holyoke, Mass., which contains a very interesting, tastefully illustrated story, on business letterheads.

The keynote of the booklet's story is the fact that every letter written carries a message much greater in scope than its words alone convey. It takes up in detail such important components of a letterhead as appearance, taction—the feel of substantialness, workability, permanence and cost—each of which is a contributing factor in designing the type of letterhead that is a sound investment—a business asset.

Users, designers and producers of business letterheads will find the text quite helpful. A copy is available for the asking.

(*Please turn to page* 284)



The MARK of Crane and what it means to you

The marking of paper with the name or symbol of the maker is an ancient custom. It is done by making an impression—from a brass device on a roll—while the paper is still wet. It is known as watermarking. Watermarks are barely noticeable except when the paper is held against the light.

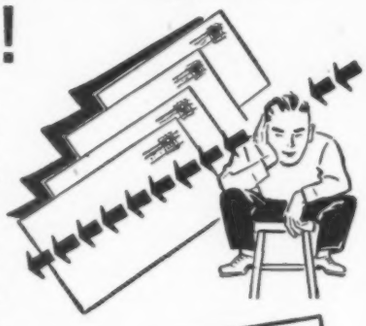
Crane's Fine Papers are so marked and have been these 146 years. It is a mark of pride in their making. It is the mark of assurance that you are getting papers made solely from cotton and linen fibres, the choicest, most enduring materials from which paper can be made. It is the mark that suggests your discriminating taste in the selection and purchase of papers for personal, social and business uses.

We suggest you look for the watermark of Crane. It is your guide to quality and craftsmanship in paper.

CRANE'S FINE PAPERS · MADE IN DALTON, MASSACHUSETTS · SINCE 1801

Straight thinking on direct mail!

TO GET ACROSS, fashion-wise promotion must be printed on a paper of style and distinction. Ask your printer about the paper you should use to get these important effects. With his intimate knowledge of paper we're sure Rising Line Marque will top his recommendations.



Rising Line Marque

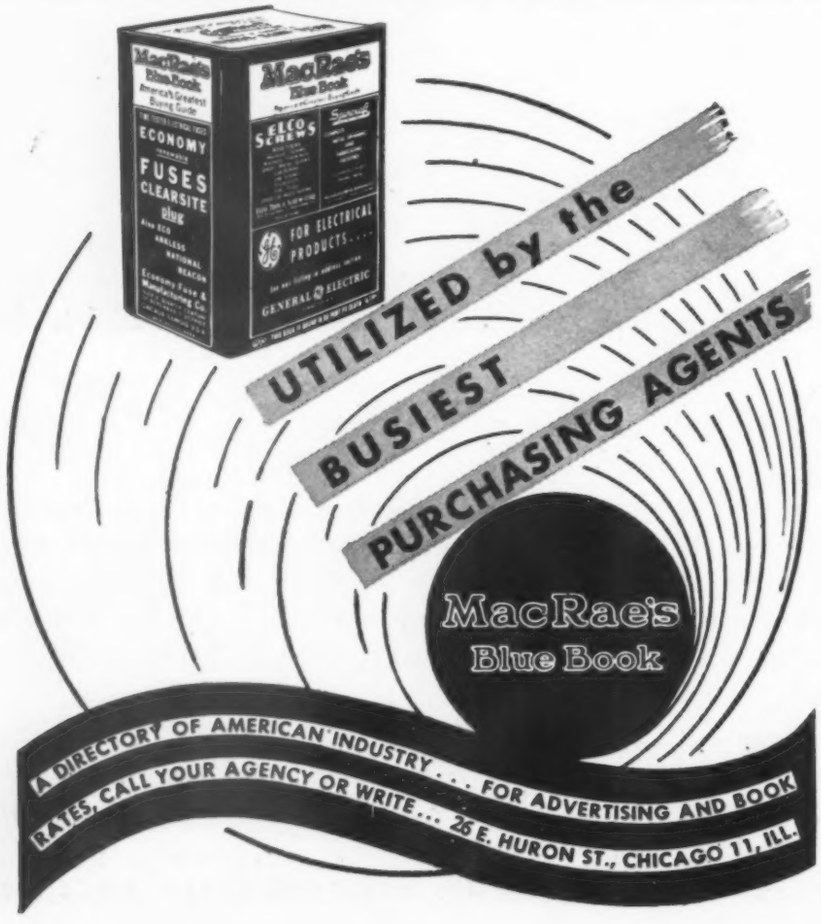
✓ 25% rag ✓ exclusive pattern inspired by Italian Handmade paper
✓ 2 weights ✓ 3 pastel shades and white ✓ envelopes in 6 sizes
✓ excellent printing surface for die-stamping, lithography, gravure or letterpress

When you want to KNOW . . . go to an expert!

Rising Papers

Ask your printer . . . he KNOWS paper!

Rising Paper Company, Housatonic, Mass.


MacRae's Blue Book
ECONOMY FUSES CLEARSITE glow
ELCO SCREWS
FOR ELECTRICAL PRODUCTS....
GENERAL ELECTRIC
UTILIZED by the BUSIEST PURCHASING AGENTS
MacRae's Blue Book
A DIRECTORY OF AMERICAN INDUSTRY . . . FOR ADVERTISING AND BOOK RATES, CALL YOUR AGENCY OR WRITE . . . 26 E. HURON ST., CHICAGO 11, ILL.

HONORED AS BEING ONE OF LEADING WOMEN INDUSTRIALISTS

Miss N. Myra Glazier, president of the Sheppard Envelope Company, Worcester, Mass., was honored at a special luncheon meeting of the National Association of Manufacturers at the Waldorf Astoria Hotel, New York, in December, by being chosen one of the four outstanding women industrialists of America. At this affair, held in conjunction with N.A.M.'s 51st Annual Congress of American Industry, the four women were selected from a group of 90 leading women industrialists because of having achieved their present positions through their own efforts.

N. Myra Glazier

The award is particularly appropriate for Miss Glazier whose background records an enviable record of personal achievement. Her early business experience was as a cashier in a large department store. After two years she entered the envelope business as a payroll clerk, and has progressed to become president-treasurer, and chairman of the board of the Sheppard Envelope Company.

During her career at Sheppard Envelope Company she has played a major role in the purchasing of capital equipment for the plant, particularly envelope making machinery. Much of the equipment used in the company's envelope production has been obtained through her personal efforts. She also maintains careful supervision of the purchase of paper which is the second most vital purchasing function of the company.

Born in Worcester, Miss Glazier was educated in the local schools, completing her education at the Holden School, Lafayette Institute, and Boston University, following which she began her business career. She is quite active in civic and cultural affairs in Worcester.

PAISLEY ACQUIRES THE LIGNOTITE COMPANY

Earl C. Lenz, sales manager of Paisley Products, Inc., Chicago, Ill., recently announced that his firm had purchased the Lignotite Co., formerly at 882 Milwaukee Ave., Chicago. The purchase included all formulas, manufacturing processes, technical and customer records and supplies. All manufacturing of the Lignotite product line will be done at Paisley's Chicago plant. This consolidation with the present Paisley series of synthetic resin and rubber emulsions, animal glues and dextrine

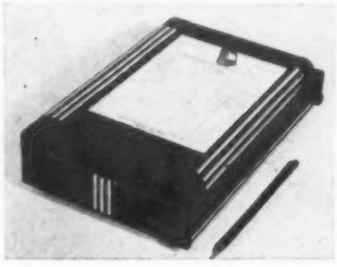
products, provides a well rounded adhesive and related chemical line for all industrial fabricating, gluing, combining and packaging operations.

NEW LINE OF OFFICE CHAIRS

Bulletin recently released by the W. H. Gunlocke Chair Co., Wayland, N. Y., describes the company's new "40" series office chairs. The chairs are carefully proportioned, of generous size, and seats have roll edge. Swivel and leg chairs are available in oak, walnut finish, mahogany finish, genuine walnut, green and gray finishes.

BANTAM PORTABLE REGISTER

Illustration shows the new Bantam portable register recently introduced by the Autographic Register Company, Hoboken, N. J. This aluminum, book-light register is designed to give the strength of a counter model to a device that can



Portable Register

be easily carried. The cover opens from the side instead of from conventional top-to-bottom position. This is said to distribute the tension, take the pressure off the hinges and diminish the possibility of accidental break-off.

The Bantam uses Durographic Ink Paper, claimed to last five times as long as ordinary carbon paper, to make multiple copies of hand-written purchase orders, receiving reports, requisitions and other records in office and factory.

BEMIS' CALENDAR FOR 1947

A 1947 wall calendar, 15" x 32", is being distributed by Bemis Bro. Bag Co. Copies are available from any of the company's 34 offices.

Printed in dark brown on a pale green background, each of the twelve pages features the current month, supplemented by the preceding and the following month.

At the top of each page is a large photograph. Twelve different operations in the manufacture of burlap, cotton and paper bags are featured. Large bold print makes this calendar easy to read, and the photographs are both attractive and educational.

(*Please turn to page* 286)

IT'S ALWAYS *Good Taste!*

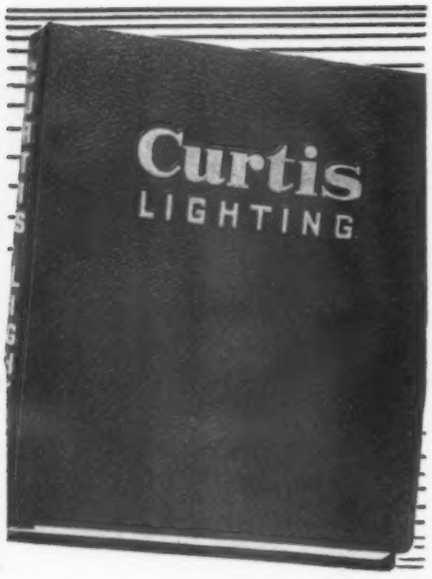
BETTER buy your own, big boy! You wouldn't want the boys to see your masculine "John Hancock" on the dainty-sized soft pastel stationery the lady uses. Remember Emily Post? She says that's right for the ladies, but gentlemen — use only white or ivory man-sized sheets. In business correspondence your choice of envelope is just as important, and for that you can rely on Sheppard.

For any occasion — business or social, Shepco Envelopes with the Flavor-Seal flap are in the best of taste always.

You can TASTE the difference.

Sheppard
ENVELOPE CO.

One Envelope Terrace • 'Phone 2-4674
WORCESTER • MASSACHUSETTS



Quick Deliveries

ON CATALOG COVERS

The "know how" of nearly fifty years of experience goes into the production of our wide and varied line of covers for catalogs, sales manuals, price books and advertising portfolios.

Let our modern creative and manufacturing facilities produce handsome, lasting covers for your new loose leaf sales and advertising publications—while the pages are being printed.

WRITE FOR CATALOG 11

Features modern fast operating binders. Shows how to dress up your literature and insure its life for years instead of months.

THE C. E. SHEPPARD CO.
44-05 21st Street
Long Island City (1) New York

MACHINE FOR CREASING PLASTIC SHEETING

Electrically operated unit known as the "Thermocreaser" for creasing or folding cellulose acetate, ethyl cellulose and other thermoplastic materials on a precision production basis, is announced by the Plastics Equipment Division of Tabor Instrument Corporation, North Tonawanda, N. Y. The new unit, reported capable of producing a 90° crease or fold on 5-to-20 pt. plastic up to 30" in width, provides thermostatically controlled instant-crease action. Hand-fed, foot operated, the unit is said to be easy to operate, and

Creases Plastic Sheeting

inexperienced operators can readily learn to make right angle crease or fold plastic sheeting of 5-20 pt. range almost effortlessly. The crease or fold is made through extraction of heat from an accurately-heated, thermostatically controlled blade, which presses material into metal die or resilient rubber pad.

* * *

AIR MAIL STAMPS NOW FIT STAMPER

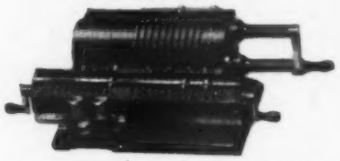
The Multipost Stamp Affixer, product of Commercial Controls Corporation, Rochester, 2, N. Y., is adapted for use

Multipost Stamp Affixer

on the new 5¢ airmail stamps which may be bought in coils of 500 stamps. As many as 150 stamps per minute may be applied; automatic piece-counter simplifies postage accounting and control. Machine may also be used for applying stamp-size stickers that may be available in coils of 500.

(*Please turn to page* 289)

ORIGINAL-ODHNER
"THE MACHINE TO COUNT ON"



A HANDY CALCULATOR

FIGURES FAST—

When and Where You Need Them

HERE'S THE ANSWER to management's demand for a low priced, fast calculator. Entirely portable. Ready to go any place —any time. Hundreds of auxiliary uses in large organizations. Keep one on every desk, where quick calculations are necessary.

SAVES TIME AND MONEY EFFORT AND ERRORS

IVAN SORVALL
210 Fifth Ave., New York 10, N. Y.

Ask for Bulletin FP-23

Never before such
FAST, EASY FILING
portable file with
PENDAFLEX HANGING FOLDERS

"Pendaflexer" The Oxford

This new post-war "Pendaflexer" brings you double filing convenience – a handsome, sturdy steel filing cabinet on wheels, plus *hanging Pendaflex* folders.*

Roll the "Pendaflexer" anywhere you need it – that's convenience number one. Then file and find papers instantly in modern hanging Pendaflex* folders–that's convenience number two!

It's a combination that will break every filing and finding speed record wherever used. Get your "Pendaflexer" now–immediate delivery.

Reg. U.S. PAT. OFF

OXFORD FILING SUPPLY COMPANY, INC.
322 Morgan Avenue, Brooklyn 6, N. Y.
Send Coupon for Illustrated Price List
Name.....
Address.....
.....

COLOR PHOTOGRAPH BY LEJAREN À HILLER

A Letter, too, can 'cool its heels'!

IF YOU HAD A SALESMAN who was consistently unsuccessful, who spent most of his time "cooling his heels" in waiting rooms, you'd do something about it.

But letters also can cool their heels – shoved aside on desks, dropped in wastebaskets unread.

There is no single cure for unsuccessful letters, but a long, long step in the right direction is a good letterhead, well printed on HOWARD BOND.

HOWARD BOND, whether in *whitest* white or your choice of its twelve clean colors, emphasizes the importance of your message, helps attract the attention that leads to careful consideration. Thousands use it, not only for letterheads, but for business forms and other kinds of vital business printing. So many use it, in fact, that it is called "The Nation's Business Paper."

HOWARD PAPER MILLS, INC. • HOWARD PAPER COMPANY DIVISION, URBANA, OHIO

Howard Bond

"THE NATION'S BUSINESS PAPER"

"How do you spell thr-r-rifty ?"

That's the nice part about MAXWELL BOND. Its low cost makes it perfect for all types of business forms—inter-office correspondence, departmental records, copies, order blanks and all the things consumed in *volume* in every office.

And MAXWELL has all the physical qualifications for the kind of saving that goes with such things as erasure without spoilage, the production of plenty of clear carbons, the ability to take pen, pencil and typewriter.

With all of this, MAXWELL BOND is *watermarked* and prints so cleanly one would never know it costs so little. Next time remember thrifty MAXWELL BOND. You'll see it's all we say it is!

Maxwell Bond

America's Favorite Low Cost Bond

HOWARD PAPER MILLS, INC. • MAXWELL PAPER COMPANY DIVISION • FRANKLIN, OHIO

WEAR-EVER ALUMINUM CHAIR

Below is the new Wear-Ever aluminum chair, developed by The Aluminum Cooking Utensil Company, New Kensington, Pa., for use in offices, reception rooms, cafeterias, etc.

This newest Wear-Ever product is constructed from an aluminum alloy selected because of its high strength. The alumi-

Aluminum Alloy Chair

num parts of the chair are protected by a patented oxide coating produced by an electrolytic process. This finish, integral with the metal, will not stain, corrode, or even show finger marks.

The plastic coated fabric upholstering withstands abuse and hard usage. Dirt and grease are easily removed with soap and water; will withstand alcohol and ammonia water.

Other features of this self-levelling Wear-Ever aluminum chair include Bakelite finials, rubber-cushioned nickel glides, and lock-type nuts.

The chair is available in Red, Green, Blue, or Ivory.

* * *

POSTAL SCALE

Illustration shows all metal postal scale announced by the Accurate Parts Manufacturing Co., Cleveland. The face of the scale is cream color for maximum visibility and carries a list of all domestic postal rates in various classes up to 12 ounces. The scale is available in cardinal red, office green and ivory. It is 3⅝" in height and completely enclosed. The table top is 2½" x 3".

(*Please turn to page* 291)

How to Find Money In Your Secretary's Wastebasket

Every poorly-spaced letter or report thrown in your secretary's wastebasket is money lost. Save this money with Webster's Micrometric Carbon Paper! The only carbon paper with the numbered scale, it warns typists as they approach the bottom of the page . . . assures neater typing, uniform margins.

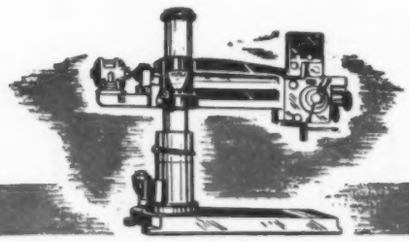
Micrometric *costs no more* than other high-quality carbon papers.

You'll get immediate delivery of Micrometric Carbon Paper—and the complete line of Webster products—from factory warehouses located from coast to coast, or from 1500 Webster dealers. This is a good thing to remember the next time you order carbon papers or typewriter ribbons; duplicating carbon papers and accessories; carbon paper ribbons for photo-offset work; ribbons and carbons for Elliott-Fisher, Addressing, Adding, and International Business Machines. Consult your nearest dealer, or write to F. S. Webster Co., 7 Amherst Street, Cambridge 42, Mass.

Better buy . . .

WEBSTER'S

Micrometric Carbon Papers and Typewriter Ribbons



PLANT PURCHASING DIRECTORY

Made to Fit the needs of

Production, Purchasing and Engineering Executives

This radial drill press is designed and built for work that would be difficult or impossible to do on a conventional drill press. Doing it otherwise would take longer, cost more.

There are many possible sources for purchasing information, but if you are an industrial buyer, the one that will best serve your needs, because it is specifically designed for your use, is PLANT PURCHASING DIRECTORY—small enough for your desk, big enough to give you full information. Keep it handy for ready-reference!

PLANT PURCHASING DIRECTORY
333 North Michigan Avenue, Chicago 1, Illinois

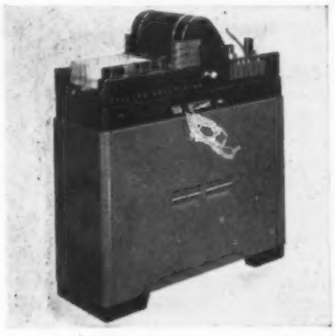
A CONOVER-MAST PUBLICATION
(Formerly Plant-Production Directory)

DUPLICATOR TURNS OUT 250 COPIES A MINUTE

New stencil duplicator, the "Model 250" with 12 new exclusive developments which make it a fully automatic stencil duplicating machine, is announced by the Niagara Duplicator Company, 128 Main St., San Francisco, Calif., and 401 Broadway, New York, N. Y.

The "Model 250" turns out 250 copies per minute, which means it prints at the rate of 15,000 copies per hour when desired. There are 7 other speeds ranging downward by steps to 60 copies per minute; feed is automatic at all speeds.

It feeds automatically almost any variety or size of paper; light onionskin, heavy paper, cardboard, postcards, rough



Automatic Stencil Duplicator

paper, slick paper, bond paper, spongy paper — and most of them can be run at the top speed of 250 copies per minute if desired.

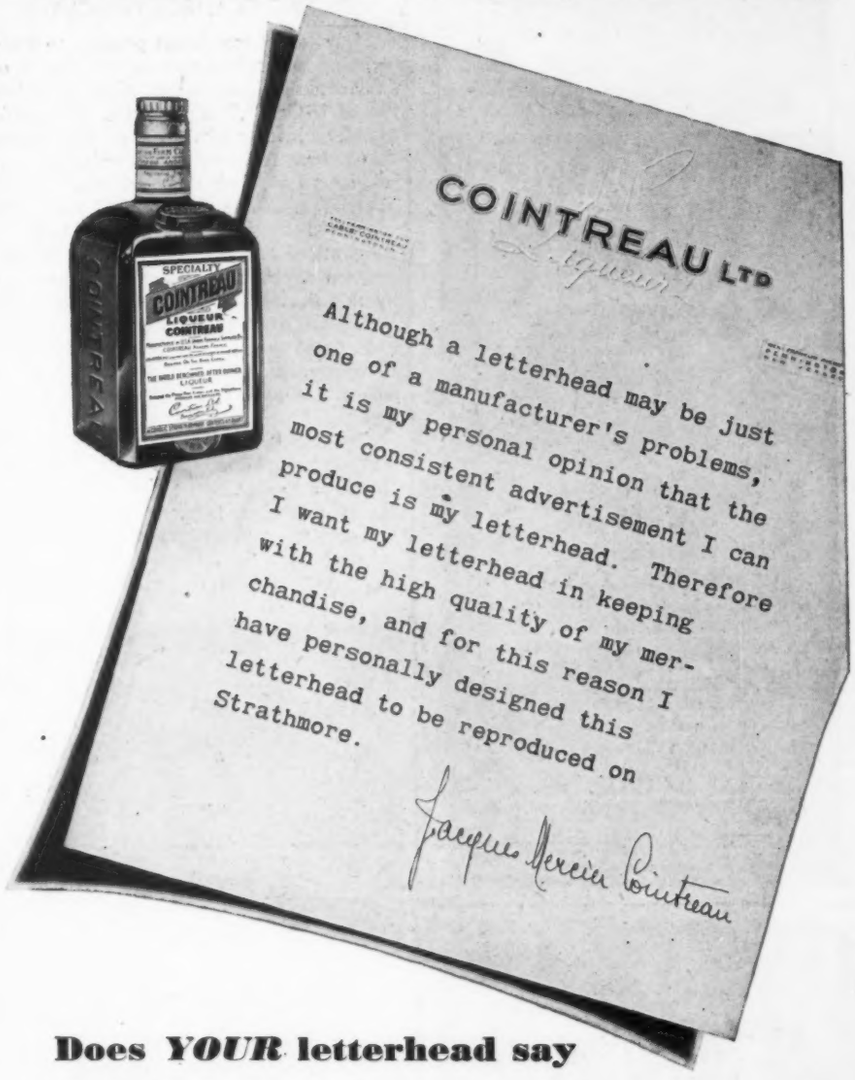
One of the outstanding features of the new machine is a newly developed dual pre-determining counter. This counter has two sets of dials — one set counts on the number of copies printed and the other set counts off the pre-determined number of copies the machine has been set to print. When the desired number of copies has been printed the counter automatically shuts off the machine and stops motor drive.

"Hairline Registration" control provides for the greatest possible utilization of the stencil process. It makes practical and routine the reproduction of manifold forms, two or more color work, inter-office forms, time cards, postcards, specifications, and a great variety of other work which many offices have previously been forced to have printed. All of these types of work are handled by the automatic feed at speeds up to 250 copies per minute.

Another feature is the "Speed Sheeter. This device will inter-leave 250 Speed Sheets between 250 printed copies per minute. The Speed Sheets, which come in loosely bound books of 100 for ease in handling, can be installed in or removed from the machine in three seconds. The entire operating attachment of the speed sheeter can be mounted on or removed from the duplicator by the operator in 10 seconds.

(*Please turn to page* 292)

Prominent Users of Strathmore Letterhead Papers: No. 69 of a Series


COINTREAU LTD
Liqueur
Although a letterhead may be just one of a manufacturer's problems, it is my personal opinion that the most consistent advertisement I can produce is my letterhead. Therefore I want my letterhead in keeping with the high quality of my merchandise, and for this reason I have personally designed this letterhead to be reproduced on Strathmore.
Jacques Mercier Cointreau
SPECIALTY
COINTREAU
LIQUEUR
COINTREAU

Does *YOUR* letterhead say

QUALITY... in every language?

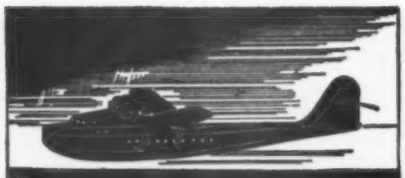
Acclaimed by connoisseurs the world over, Cointreau was first distilled in 1848 at Angers, France, by Edouard Cointreau. His formula is still a precious secret of the Cointreau family.

Your business contacts form an opinion of your firm from its letterhead. Choose a Strathmore letterhead paper... a paper that says quality in any language. The Strathmore watermark is your assurance of quality.

Strathmore Letterhead Papers: Strathmore Parchment, Strathmore Script, Thistlemark Bond, Alexandra Brilliant, Bay Path Bond, Strathmore Bond.

STRATHMORE *MAKERS OF FINE PAPERS*

Strathmore Paper Company, West Springfield, Massachusetts



THIN PAPERS
Reduce
TYPING, MAILING
and FILING COSTS
Use
ESLEECK
THIN PAPERS

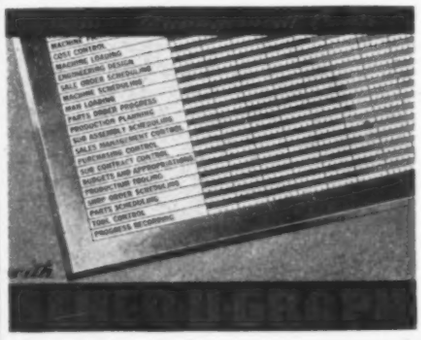
Fidelity Onion Skin
Clearcopy Onion Skin
Superior Manifold

Esleeck Manufacturing Co.
Turners Falls, Mass.

CHART BOARD APPLICATION OF TIME CONTROL PRINCIPLES

How to get maximum production from existing plant facilities is the theme of "Dynamic Management Control With Sched-U-Graph," a 32-page, full color booklet just published by Remington Rand Inc. It describes Sched-U-Graph, an ingenious and practical chart-board application of the time-control principles pioneered by Henry L. Gantt. Copious illustrations add to the convincing demonstration of economy and efficiency realized by this device, which possesses the valuable feature of combining essential record data with graphic interpretation. Complete flexibility is achieved with a basically simple and easily-operated system.

The booklet demonstrates the operating and control advantages of Sched-U-Graph as applied to loading and scheduling of machines, men, or work centers; part orders and operations; scheduling of production of sub-assemblies; inventory control of parts for line assembly;



Booklet demonstrates operating and control advantages of Sched-U-Graph

scheduling continuous production by operations; scheduling actual against required production with visual indication of leads and lags; and sales progress against sales and profit contribution quotas by branch offices of salesmen on a time or percentage attainment basis.

Executives interested in obtaining best utilization of machine and man hours in production and of salesmen's efforts will find this booklet stimulating to their thinking, for it is devoted to practical and tested methods that were developed and proved during the war and postwar period by large and small organizations.

Copies of "Dynamic Management Control With Sched-U-Graph" may be obtained without cost from any branch office of Remington Rand Inc., or by writing Systems and Methods Research Department, Systems Division, Remington Rand Inc., 315 Fourth Avenue, New York 10, New York.

WAA ORGANIZES TO PUSH SALE OF SURPLUS

A 15-point general program to push the sale of surplus property during February, March and April was contained in recent letters to Zone Administrators of War Assets Administration from Administrator Robert M. Littlejohn.

"The next sales period is a critical one," the Administrator said in his letter. "We have planned—we have organized—we have put the best man in the right places. I look to you and the regional directors to see that we get on an up-to-the-minute basis—that we do our job better than industry."

Salient points in the new general program included:

Continuation of target dates for selling—"except that beginning with 1 February 1947, all items declared surplus will be on sale within 60 days after such declaration."

Elimination of paper-work backlog, with handling of papers on a 72-hour basis.

Second offerings of surplus to include general buying public.

Development of regional and national sales to maximum degree.

Improvement and extension of customer service.

Expediting sales of automotive spare parts.

Clearance of airports for disposal by April 30, 1947.

Clearance of building machinery, supplies and installations for sale offering by April 30, 1947.

Clearance of warehouses by target dates with corresponding reduction of operating costs.

Improvement of methods and plans to "do a better job with less money."

Better sales planning and dissemination of information in handling veterans' supplies.

Old Town

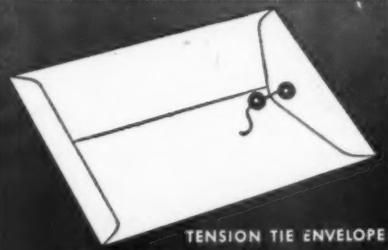
RIBBONS
CARBONS
Duplicating
Supplies

For those who prefer the best

BROOKLYN 17, N. Y.

TENSION ENVELOPES

Better Envelopes for Every Business Use



TENSION TIE ENVELOPE
"THE STRING WILL NOT PULL OUT"

TENSION ENVELOPE CORP.
FIVE FACTORIES
SELLING DIRECT TO THE USER
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LOOKING for an outstanding watermarked text paper—one that unfailingly pleases customers as well as printers themselves? Then make sure you specify International's TICONDEROGA TEXT!

Unexcelled for many uses, TICONDEROGA TEXT takes letterpress line cuts and type beautifully (it comes in both laid and wove finishes). A first choice too, for offset-lithography and photogravure in the production of de luxe brochures, announcements, booklets, broadsides, and programs.

At present, there isn't quite enough TICONDEROGA TEXT to meet the demand the quality of this very fine paper has created. But as the world's largest maker of paper we're doing our best to supply you. International Paper Company, 220 East 42nd Street, New York 17, N. Y.

INTERNATIONAL PAPERS *for Printing and Converting*

New Developments Reported at S. A. E. Meeting

Stronger-Lighter Structures, Elimination of Diesel Smoke, Return of Sleeve-Valve Engines and Fuels from New Sources Among Subjects Presented at Detroit Sessions

Application to commercial motor vehicles of electrical energy dissipators which, supplementing wheel brakes, will permit larger loads to be moved at faster speeds with greater safety, was described before the Transportation & Maintenance Session of the 1947 annual meeting of the Society of Automotive Engineers at Detroit, Mich., by J. G. Oetzel of Warner Electric Brake Mfg. Co., Beloit, Wis. The dissipator, cut in by the operator of the vehicle, creates a resistant electric field exerting a braking action and simultaneously releases heat, thereby reducing wear on the wheel brakes and gently retarding speed.

"The feeling of security in driving a heavy vehicle fitted with an energy dissipator cannot be put into words," he said. "It must be experienced."

Truck Radio Communication

Two way radio telephone equipment, already available for commercial motor vehicle fleets, was reported to have been developed to the point where selective calling methods direct code signals to specific vehicles and their operators, according to Wesley G. Bayliss of New York Power & Light Corp., Albany, N. Y. He said that signals can be coded so that they will be received only by certain vehicles and drivers.

Stronger-Lighter Structures

Plea for coordination of metallurgy, engineering, and materials specifications to make structures stronger by making them lighter was voiced before the Materials Session by Francis G. Tatnall, Baldwin Locomotive Works, Eddystone, Pa. The war has created new types of engineers, testing tools, ways of thinking, and techniques, he explained. All should be links in a productive chain of operations rid for all time of misplaced reliance upon factors of safety.

"Factors of safety do not efficiently make up for lack of statically and dynamically measured facts," he asserted. "Simpler structures, lighter sections; easier to handle, fabricate, assemble, maintain—these are possible by scientifically selecting materials (contribution of metallurgy), plus static and dynamic measurements, plus intelligent interpretation of masses of data (contribution of engineering) plus performance testing and measurement of service loads (contribution of field staff). The old truth still stands; anything that is right, looks right. When parts of a structure all take their share of the work, the resulting structure looks good. It can't help being a more graceful product, pleasing to the eye of the mass market."

Return of the sleeve valve, bringing back memories of the Knight engine, was predicted by Ralph L. Skinner of Skinner Motors, Inc., Detroit. Describing the Skinner slide-valve engine, he declared that it offers such advantages as elimination of poppet valves and resulting troubles, power-weight ratio of one to four, possibility of reducing car weights by as much as 800 pounds. By judicious application of aluminum to construction, Mr. Skinner explained, it should be possible to slice 1200 pounds from the weight of 300 h.p. truck and coach power plants. He said the slide valve engine operates without detonation on lower-octane fuels, giving better performance and economy, and eliminates present troublesome "hot spots." Slide valve design, he added, simplifies the construction of vee-engines and provides substantial benefits in the way of compactness, abbreviated crankshafts, greater power from less fuel.

Synthetic Rubber

"Americans should make their own rubber", J. E. Hale of The Firestone Tire & Rubber Co., Akron, Ohio, warned. Domestic manufacture of synthetic rubber is necessary he explained, to maintain an adequate supply and to prevent this country from being at the mercy of others as regards supplies and prices. Mr. Hale declared that further scientific development will produce synthetic tires, tubes, and other rubber products which are the equal, if not the superior of those made from natural rubbers.

"Through chemical processes we should be able to manufacture our own rubber," he asserted. "Since we are starting with material that costs a half-cent a pound, we certainly ought to be able to make it at really a very attractive price. Not only is it desirable to get low basic costs with proper quality, but of greater importance it is necessary to get the production of our manufactured rubber under American commercial control so we can avoid the enormous fluctuations in price which the rubber industry had to tolerate over the years."

Mr. Hale insisted that the wartime synthetic rubber plants, in which the American public has invested $700,000,000, be used for productive purpose before the country again becomes dependent upon foreign sources.

Diesel Smoke

Smoke from diesel engines, cause of public complaint, is an unnecessary evil which can be eliminated by keeping engines in good repair, operating on good fuels, and by preventing overloads, Prof. P. H. Schweitzer of Pennsylvania State College, State College, Pa., assured the Diesel Engine Session. Unfortunately, he added, smoke is eliminated at the cost of engine efficiency since, with current injection equipment, prevention of overloading throughout the speed range involves reduction of low-speed torque, or lugging ability. He said that experiments indicate that normal engines burning normal fuel have smoke-free exhausts between one-quarter and three-quarter loads. Light loads may cause cold smoke, overloads increase smoke density. Belated injection timing, poor fuel mixing, low fuel volatility and cetane number were said to contribute to smoking tendencies.

Fuels from New Sources

Captain W. C. Latrobe, of Navy Department Bureau of Ships, Washington, D. C., reported that tests have demonstrated the possibility of operating Navy ships on gasoline and diesel fuels made from coal, natural gas, and oil shale. Primary interest of the Navy, he added, is to bring about the development and manufacture of diesel engines and fuels productive of the highest possible specific power output. Present study is directed along the lines of determining what components and additives for diesel fuels will contribute to higher performance, and what engine modifications will take advantage of superior special fuels.

ELECTRO-POLISHING SILVER PLATING DISCOVERED BY WESTINGHOUSE PHYSICIST

A process for electro-polishing of silver plating, stemming from the accidental use of a silver plated wire in cleaning phospor bronze electrolytically, is accredited to Dennis R. Turner, Westinghouse physicist. He discovered the process after adding cyanide to an electro-cleaning solution in which he was washing phosphor bronze for microwave tubes.

One of the little diaphragms had been suspended in the bath through which alternating current was passing, by a strand of wire previously used to immerse some object being silver plated. The wire was a dull white in appearance as silver plate always is before being polished. But when the phosphor bronze diaphragm was lifted out of the solution the piece of wire had taken on a high luster. Here was something the silver industry had been looking for for many years—a means of electro-polishing silver plating. Previously electroplated silver was buffed by hand on a revolving wheel which meant extra handling of every piece and the loss of a certain proportion of silver through abrasion.

HOT WATER SUPPLY BOILERS RECOMMENDED STANDARD

Recommended Commercial Standard for Testing and Rating Hand-Fired Hot Water Supply Boilers, No. TS-428, is being circulated to manufacturers, distributors, users and testers by the Division of Trade Standards, National Bureau of Standards, Washington, D. C., for their written acceptance. All sizes of hot water supply boilers are covered, and the rating is defined as the maximum output in Btu per hour, and as the capacity in gallons of water heated 100° F in three hours.

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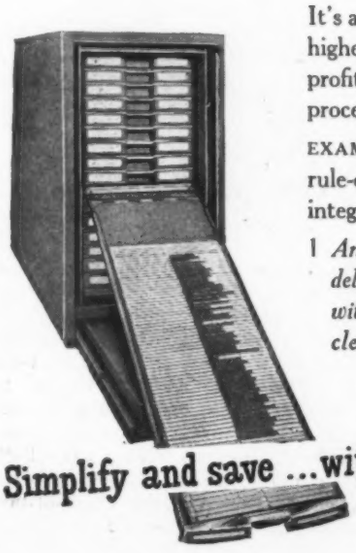
Can your profits afford to foot THIS bill?



Simplify and save ...with KARDEX

It's a dangerous habit to accept ALL of today's higher costs. For many *controllable costs* can be profitably reduced by simplifying systems and procedures throughout your business.

EXAMPLE: One typical company replaced their rule-of-thumb purchasing procedures with an integrated Remington Rand system. Results:

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2 *Expediting and delivery follow-up has become automatic through the use of Visible Tip follow-up folders. More time and money saved!*

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Whether your costs are high in sales... inventory... production... or ledger... Remington Rand simplified systems can pay you extra savings by reducing *controllable* costs. For our free 96-page systems analysis, *Graph-A-Matic Management Control*, write Systems Division, 315 Fourth Ave., N Y 10.

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THE FIRST NAME IN BUSINESS SYSTEMS

PERSONALITIES *in the* NEWS

Raymond A. Boyce, former General Purchasing Agent and member of the board of directors of the Philco Corporation,

Raymond A. Boyce

Philadelphia, Pa., has been promoted to Director of Purchases. In this capacity he will concentrate on over-all planning and general administrative work on the staff level. **William Mac Murtie** has been appointed General Purchasing Agent. Mr. Mac Murtie has been associated with the radio industry since 1921 and has been with the Philco Corporation since 1935 when he joined the purchasing department. In 1938 he was placed in charge of the Chicago office of the company's purchasing department and later became divisional purchasing agent for the automobile radio division with offices in Detroit. In 1943 he was named Assistant General Purchasing Agent, and during

William Mac Murtie

the war did an outstanding job in connection with his company's production of airborne radar equipment for the Army and Navy and more recently in helping the company reconvert to civilian production.

A. E. Edmondson has been appointed buyer in the purchasing department of the Pure Oil Co., Houston, serving under Sam H. Harper, Purchasing Agent for Pure Oil, and first vice-president of the Houston Purchasing Agents Association.

Carl A. Ilgenfritz has been elected Vice President-Purchases of the United States Steel Corporation, Pittsburgh, Pa., succeeding Charles R. Miller, Jr., who has retired. Since September, 1945, he has been Vice-President in Charge of Purchases, Carnegie-Illinois Steel Corp. Mr. Ilgenfritz began his business career as a storekeeper with the Youngstown Sheet and Tube Co., later serving in the mechanical department. In 1913 he joined the engineering department of the Brier Hill Steel Co., becoming Assistant Purchasing Agent in 1917 and Purchasing Agent a year later. Subsequently he organized the Stroh-Ilgenfritz Co., Youngstown, dealers in coal, coke, pig iron and alloys, now the Stroh-Butler Co. He resigned as vice president of this concern in 1924 and became Assistant Purchasing Agent for Youngstown Sheet and Tube Co. He was named General Purchasing Agent for the United Alloy Steel Corp., at Can-

Carl A. Ilgenfritz

ton, in 1925, and the following year became director of purchases for Central Alloy Steel Corp., Massilon. When Republic Steel Corp. was organized in 1930 by the merger of Republic Iron and Steel Co., Central Alloy Steel Corp., and other producers, he became Director of Purchases of Republic and in 1933 was made Manager of Purchases and Raw Materials. Mr. Ilgenfritz is a member of the Pittsburgh Purchasing Agents Association; Union Club, Cleveland; Duquesne Club, Pittsburgh; the Pittsburgh Athletic Association, and the American Iron and Steel Institute.

J. A. Collins has been appointed Purchasing Agent of the Beaumont division, Sun Oil Company, Houston, Texas, succeeding W. F. Wilson, retired. Mr. Collins has been associated with Sun Oil since 1937 when he started out as a field clerk. In 1939 he was transferred to the inventory branch of the accounting department, and in 1942 to the purchasing department under Mr. Wilson.

R. L. Van Cleve has been appointed Director of Purchases, Carnegie-Illinois Steel Corporation, Pittsburgh, Pa. He

R. L. Van Cleve

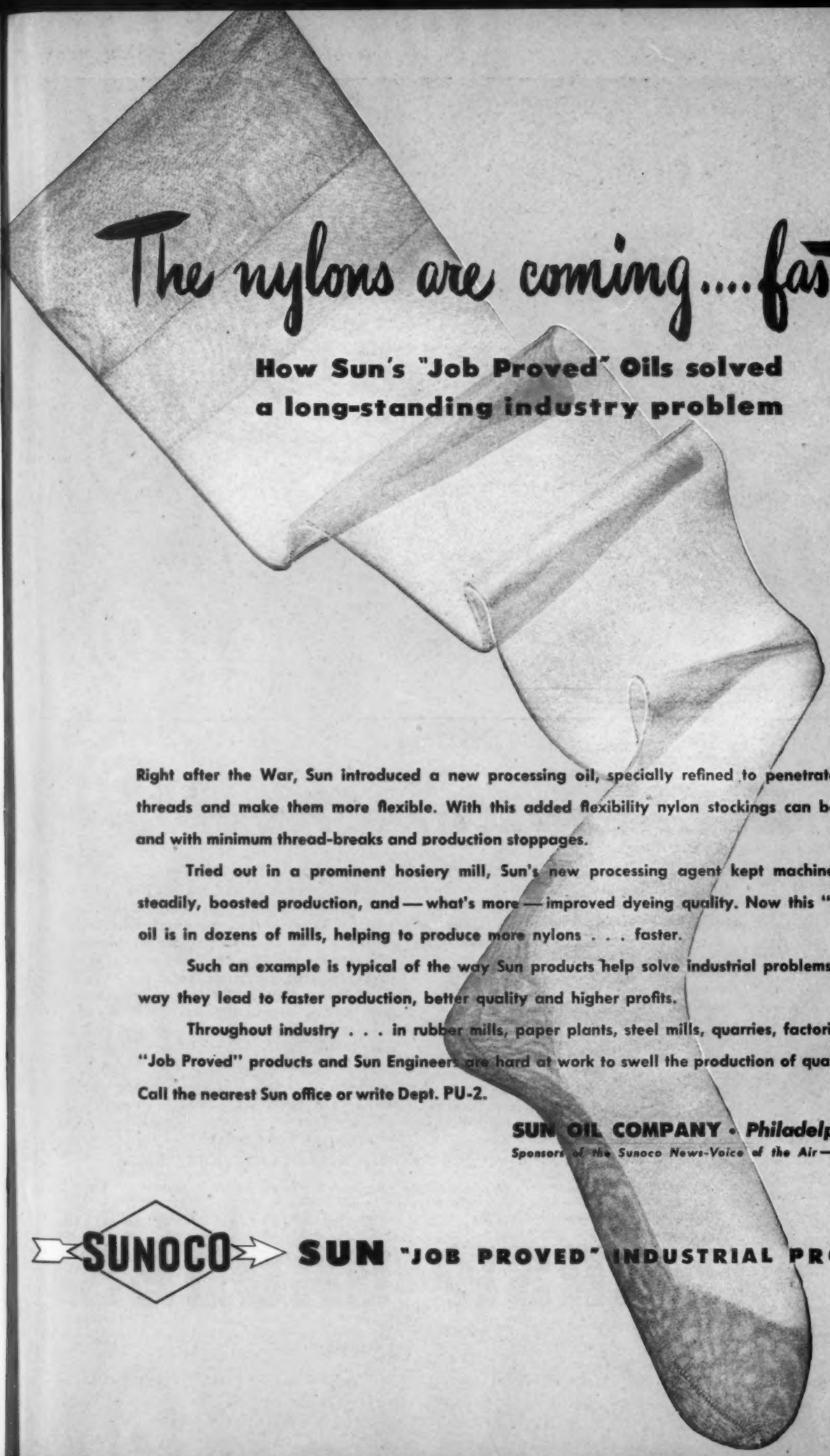
had been General Purchasing Agent since September 1945. Mr. Van Cleve was graduated from Princeton University in 1913 with a degree in civil engineering, and was a field engineer with Riter-Conley Mfg. Co. before starting with Carnegie Steel Co. in 1914, in the open hearth department at Edgar Thomson Works, Braddock, Pa. In 1920 he was transferred to the company's general offices in Pittsburgh, and four years later was made assistant special agent. He was named manager of blast furnace products, coke by-products and scrap in 1934, and the following year became Assistant Purchasing Agent.

Walter H. Weise has been named Director of Purchases for Victor Chemical

Walter H. Weise

Works, Chicago, 6, Ill. Mr. Weise joined the purchasing department at Victor in 1917 after four years with U. S. Steel Corp. He was promoted to Assistant Purchasing Agent in 1923 and in 1925 became Purchasing Agent. **Merton E. Jones,** manager of priorities during World War II has become Purchasing Agent. He has been with the company since 1924 when he joined the purchasing department. He became manager of priorities

(*Continued on page* 300)



The nylons are coming....faster!

How Sun's "Job Proved" Oils solved a long-standing industry problem

Right after the War, Sun introduced a new processing oil, specially refined to penetrate into nylon threads and make them more flexible. With this added flexibility nylon stockings can be knit faster and with minimum thread-breaks and production stoppages.

Tried out in a prominent hosiery mill, Sun's new processing agent kept machines operating steadily, boosted production, and — what's more — improved dyeing quality. Now this "Job Proved" oil is in dozens of mills, helping to produce more nylons . . . faster.

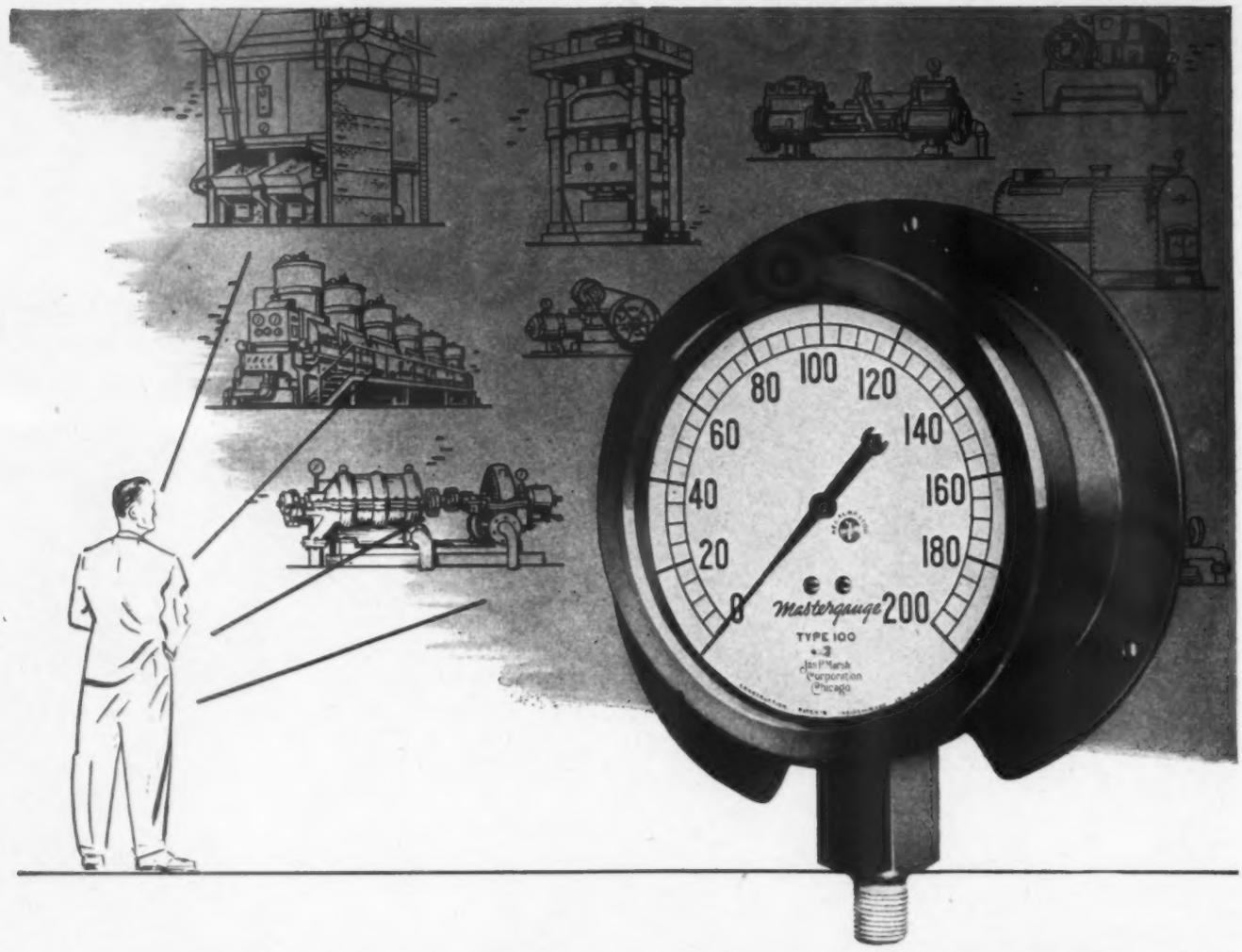
Such an example is typical of the way Sun products help solve industrial problems, and of the way they lead to faster production, better quality and higher profits.

Throughout industry . . . in rubber mills, paper plants, steel mills, quarries, factories . . . Sun "Job Proved" products and Sun Engineers are hard at work to swell the production of quality products. Call the nearest Sun office or write Dept. PU-2.

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News-Voice of the Air — Lowell Thomas

SUNOCO **SUN "JOB PROVED" INDUSTRIAL PRODUCTS**



Between you...and Trouble—

What's going on inside that boiler . . . tank . . . compressor . . . pump . . . forging press? It takes a pressure gauge to tell the story—and a good one to tell it right.

Keep that in mind when you select a gauge. Avoid the "just-stick-on-a-gauge" attitude. Remember that safety and performance depend on the accuracy — the "honesty"—of that gauge. Remember that your old friend, the pressure gauge, stands between you and trouble.

Those who *do* know the importance of accuracy insist on pressure gauges of Marsh quality. Excellent proof of this is the use of Marsh Gauges as original equipment by leading manufacturers of products requiring pressure indication.*

In the Marsh Masterguage, with its lathe turned bourdon tube and rugged, precision movement, they have found a pressure gauge that will maintain its accuracy year after year under the most arduous service industry knows—extreme pressure, heat, vibration, pulsation. And in all Marsh Gauges, down to the moderately priced Marsh "Standard" Gauges, they have found the same uncompromising quality that has made Marsh Gauges "The Standard of Accuracy."

When you select a pressure gauge—or when you select equipment requiring a gauge—insist on a Marsh. It will stand between you and trouble!

The gauge with the "Recalibrator"

Marsh alone has the "Recalibrator"—quickest and best way to correct a gauge that has been knocked out of adjustment by improper handling.

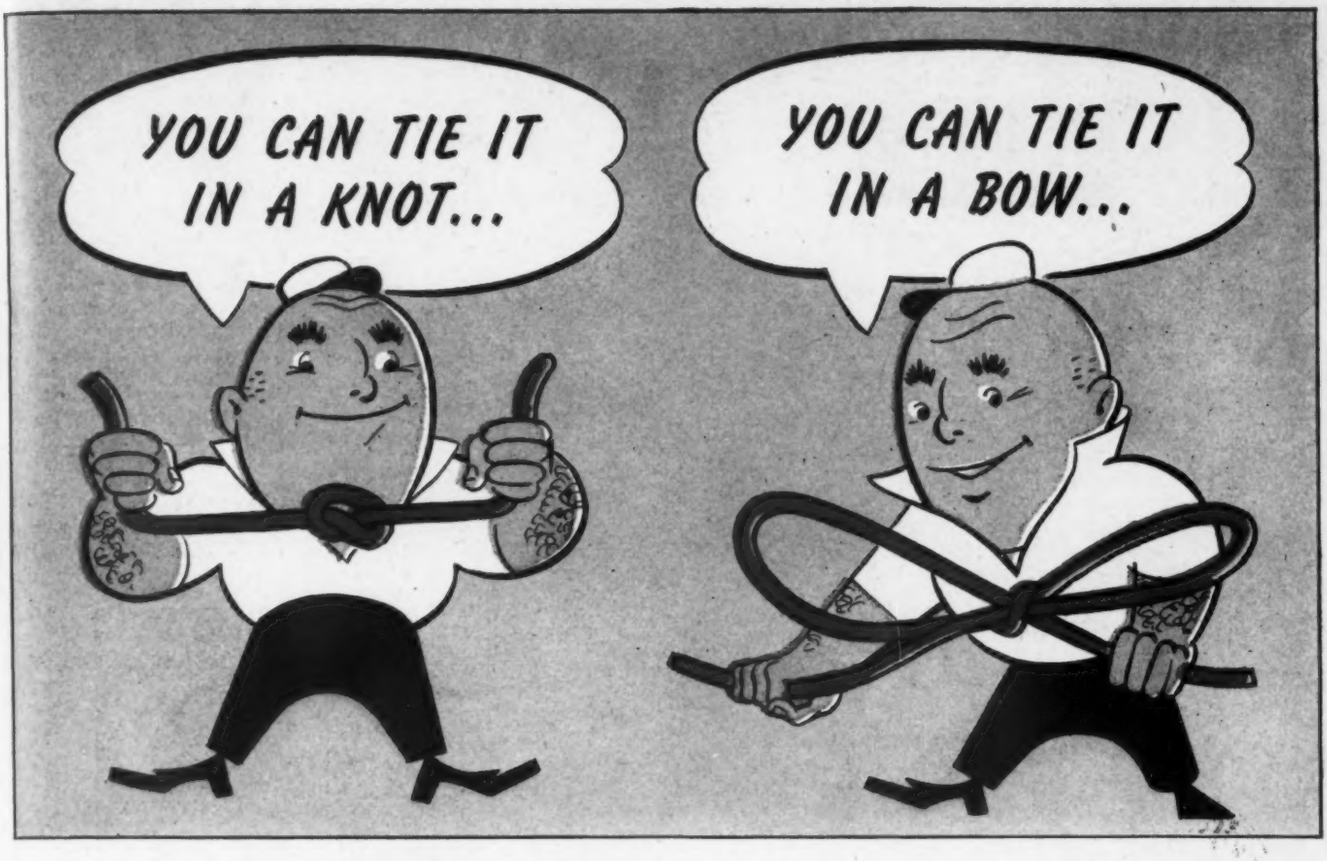
*Subsequent advertisements in this publication will cite typical examples of this.

Jas. P. Marsh Corporation, 2035 Southport Avenue, Chicago 14, Illinois

Jas. P. Marsh products include: A full line and range of gauges in pressure, compound, altitude, hydraulic, sprinkler, ammonia, ounce-graduated retard, test, and diagram types. Dial thermometers in rigid stem and remote reading types. *Ask for literature.*

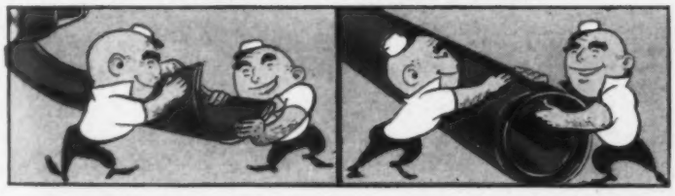
MARSH GAUGES

"THE STANDARD OF ACCURACY"



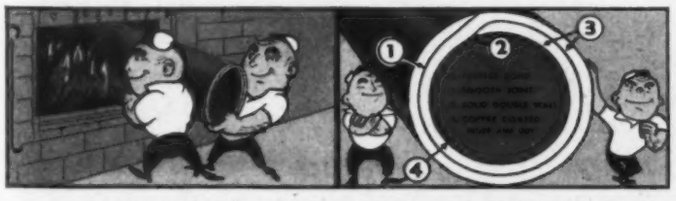
Bundyweld Steel Tubing Fabricates With Ease

WHY BUNDYWELD IS BETTER TUBING



1 Bundyweld Steel Tubing is made by a process entirely different from that used in making other tubing. A single strip of copper-coated S.A.E. 1010 steel is continuously rolled twice laterally . . .

2 . . . into tubular form. Walls of uniform thickness and concentricity are assured by the use of close tolerance cold rolled strip. This double rolled strip passes through a furnace where the . . .



3 . . . copper coating fuses and alloys with the double steel walls. After brazing and cooling, it becomes a solid double wall steel tube, copper brazed throughout 360° of wall contact . . .

4 . . . copper coated inside and out, free from scale, closely held to dimensions. Hard or annealed in standard sizes up to ⅝" O.D. Special sizes cold drawn. Also in Monel, nickel and nickel alloys.

When you rely on Bundyweld Steel Tubing, you realize extra economy.

You save precious time in production, because this modern tubing fabricates with ease. And you gain in dependability, because of the strength imparted by Bundyweld's unique solid, double-wall construction. Bundyweld meets three vital tubing needs:

- **Great Resistance to Vibration Fatigue**
- **High Bursting Point in Pressure Applications**
- **Low Cost**

Every working day, nearly two million feet of Bundyweld Steel Tubing roll out of our plant to become vital parts in motor vehicles, cooling equipment, gas ranges and other items of modern industry.

The chances are good that Bundyweld can help your products, too. Write today. *Bundy Tubing Company, Detroit 14, Michigan.*

BUNDY TUBING

ENGINEERED TO YOUR EXPECTATIONS

BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES

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San Francisco 10, Calif.

Standard Tube Sales Corp.
1 Admiral Ave.
Maspeth, N.Y.C., N.Y.

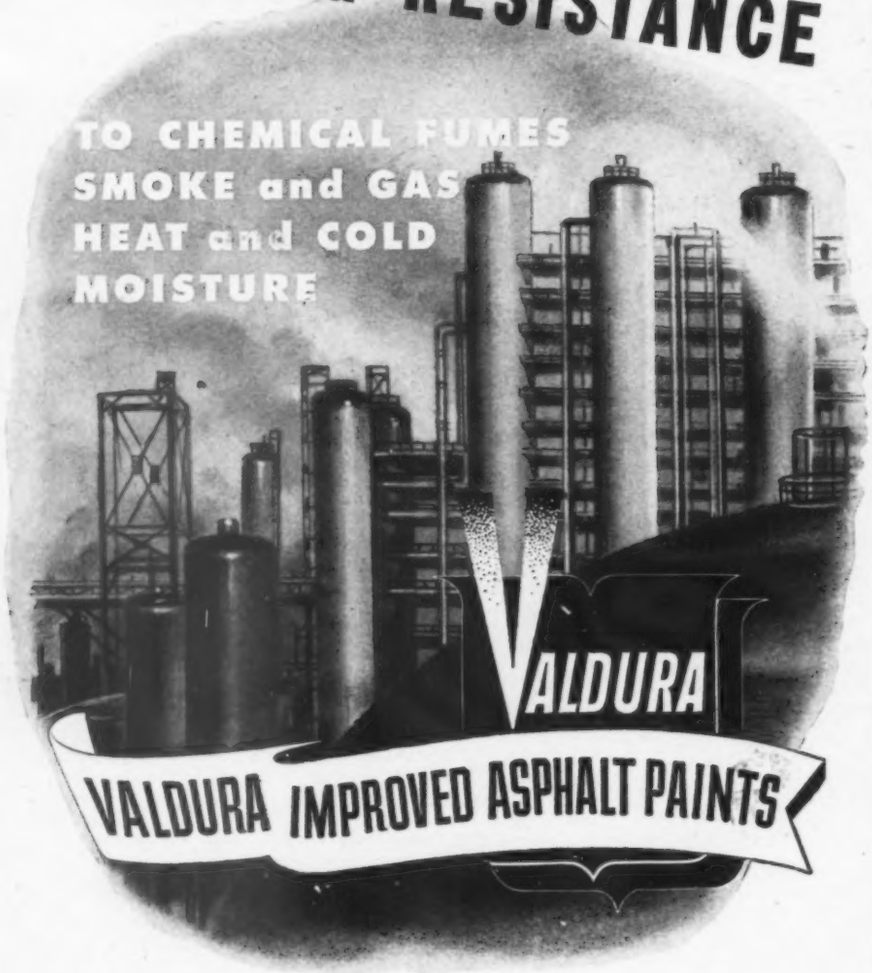
Lapham-Hickey Co.
3333 W. 47th Place
Chicago 32, Illinois

Rutan & Co.
404 Architects Bldg.
Phila. 3, Pa.

Eagle Metals Co.
3628 E. Marginal Way
Seattle 4, Wash.

Alloy Metal Sales Ltd.
861 Bay St.
Toronto 5, Canada

Asphalt Paints ASSURE AMAZING RESISTANCE



Valdura Improved Asphalt Paint, formulated with 99.5% pure Gilsonite Asphalt and Valdura processed oils combine science's most efficient waterproofing and preservative materials into a heavy duty paint with amazing resistance. It assures unsurpassed protection against rust, corrosion, chemical fumes, smoke, gas, moisture and extremes of temperature. Use it indoors or outdoors, above or below ground—wherever surface protection is important. Valdura Improved Asphalt Paint supplies a tough, elastic protective coating that will last for years. In most cases it requires no special surface preparation. Use it anywhere on any surface.

AMERICAN-MARIETTA COMPANY 43 E. Ohio Street, Chicago 11, Ill.

(*Continued from page* 296)

in 1941. **Ferdinand G. Heyd** is Assistant Purchasing Agent. In announcing the promotions of these executives, Walter H. Brown, president of the company, stated: "Difficulties in obtaining building materials, and strikes in plants of equipment manufacturers have delayed construction of our elemental phosphorus electric furnace plant in Florida. It is necessary, therefore, that we put increased emphasis on purchasing even before the new plant is in operation to add to the raw material supply requirements of our other three plants."

C. Claude Watkins, Vice President in Charge of Purchases, General Box Company, Chicago, Ill., has been elected to the company's board of directors.

Carl E. Lyon has retired as Vice President and Director of Purchases, Cribben and Sexton Company, Chicago, Ill. He will continue his association with the

Carl E. Lyon

company in an advisory capacity. He had been with the company for more than 46 years, having started as a stockroom boy. Eventually he became paymaster, general superintendent, then vice president and Director of Purchases.

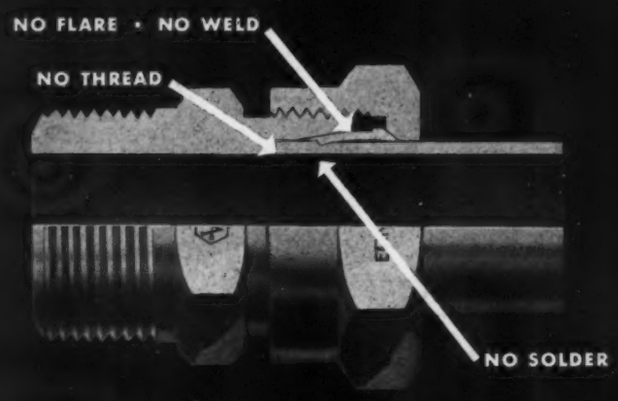
William B. Gold, Purchasing Agent for the Electric Storage Battery Co., Philadelphia, Pa., died recently at the age of sixty-six. He had been associated with the company since 1900 and became Purchasing Agent in 1913. Mr. Gold was one of the organizers of the Philadelphia Association of Purchasing Agents and served as its president and director for several years. He was also a founder of the National Association of Purchasing Agents, serving as its vice-president and director. He was very active in Philadelphia civic affairs and a member of several clubs.

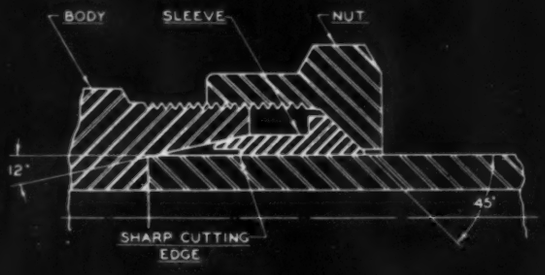
David H. Thomas, Purchasing Agent, Utah-Idaho Sugar Co., president of the Utah State Fair Assn., and member of the centennial commission, spoke recently before the Salt Lake Optimist Club, at the Hotel Utah, Salt Lake City. His topic was "What the 1947 Centennial Means to Utah".

John B. Heffron resigned recently as County Purchasing Agent, Kent County, Michigan. He had been Purchasing Agent for six years and prior to his appointment served for many years as Grattan Township supervisor.

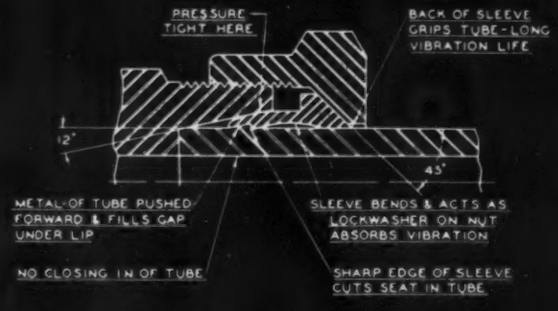
(*Please turn to page* 302)

No Other Fitting has this





Tube Inserted in Fitting—
Nut and Sleeve Snug


PRESSURE TIGHT HERE
BACK OF SLEEVE GRIPS TUBE-LONG VIBRATION LIFE
12°
45°
METAL OF TUBE PUSHED FORWARD & FILLS GAP UNDER LIP
SLEEVE BENDS & ACTS AS LOCKWASHER ON NUT ABSORBS VIBRATION
NO CLOSING IN OF TUBE
SHARP EDGE OF SLEEVE CUTS SEAT IN TUBE

Nut Tightened In Place

Exclusive Design

MORE and more Contractors and Manufacturers are learning *to their profit*, the benefits of Weatherhead Ermeto Fittings. They solve the mechanical problem of connecting tubing without the necessity of flaring, threading, welding or soldering. This is truly a time-saving fitting.

Connections are quickly made which will, in most instances, hold beyond the burst strength of the tube itself and withstand excessive vibration without loosening the joint.

There is a size and type of Ermeto fitting for practically every application. Can be furnished in O. D. tube sizes from ⅛" to 2" inclusive. Special sizes are available to meet your individual requirements.

Look Ahead with

Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO

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FREE!

Write today for the fully illustrated Ermeto Catalog and learn how Weatherhead Ermeto fittings can provide dependable connections for hydraulic, air, water or oil lines.

Your nearest Weatherhead office will be glad to consult with you and provide any technical literature.

Shanties are out of style

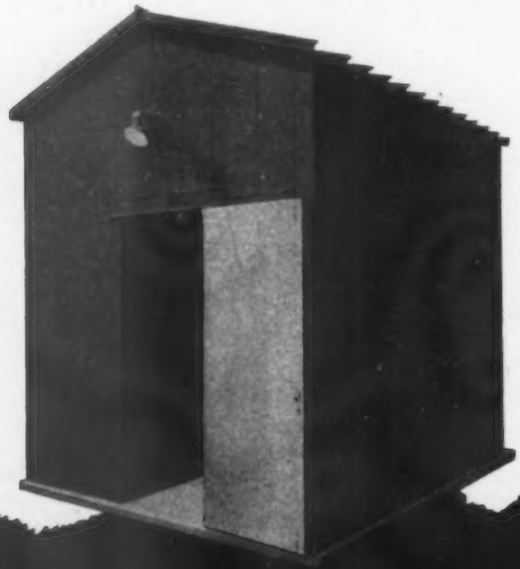
It's good business to keep your small utility buildings out of the shanty class. You can do it at low cost and get much better structures by specifying standard ARMCO STEELOX Buildings.

This way your utility buildings, tool houses, and other buildings have the two big advantages of a permanent structure—long life and low upkeep—plus easy portability. Should conditions change, they can be taken down and reassembled in another location.

STEELOX Buildings are adaptable to many requirements. They can be quickly wired and may be insulated, or may be left uninsulated without affecting weather-tightness. All-steel construction is an excellent fire-barrier, while interlocking joints help keep out dust and vermin. The galvanized PAINTGRIP surface of STEELOX can be painted immediately—assures long paint life.

STEELOX Buildings are prefabricated in a wide range of standard sizes. They are easy to handle and are erected quickly by unskilled labor.

Write for prices and information on standard ARMCO STEELOX Buildings. Armco Drainage & Metal Products, Inc., 705 Curtis Street, Middletown, Ohio.



ARMCO STEELOX BUILDINGS

Chester F. Ogden, formerly Assistant Purchasing Agent, has been appointed Purchasing Agent for the Detroit Edison Company, Detroit, Mich. Mr. Ogden has been with Detroit Edison since 1934 when

Chester F. Ogden

he was graduated as an engineer with business training from the University of Michigan. He is vice-chairman of the Public Utilities group of the National Association of Purchasing Agents. **Fred A. Compton,** formerly Purchasing Agent

Fred A. Compton

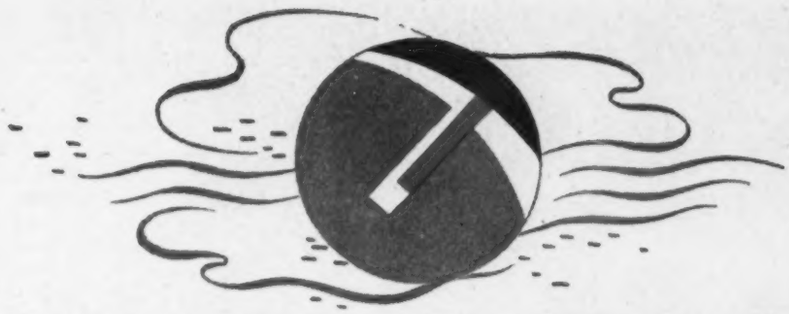
of the company has been appointed sales manager. He graduated from the engineering college of the University of Michigan in 1914 and has been with Detroit Edison's construction and purchasing departments since then except for service as an officer in World War I. He has been active in the work of the Public Utilities section of the National Association of Purchasing Agents, and served as chairman of the group from 1941 to 1943. He was in charge of purchasing at Detroit Edison since 1939.

James Neal, City Manager, and Purchasing Agent of Redding (Shasta Co.,) California, recently received a vote of confidence from the city council after a reading of the report of his accomplishments during his first six months in charge of city affairs. Mr. Neal is credited with balancing the city budget, installing a purchasing system, inaugurating a fire prevention program, abolishing city employee fee collections, reorganizing the police department and other modernizations.

B. F. Nelson, Director of Purchases, Best Foods, Inc., New York City, has been made Vice President in charge of Purchasing.

T. H. Seavey, Manager of Purchases, The Fluor Corp., Ltd., Los Angeles, Calif., has been appointed a Director of the corporation.

(*Please turn to page* 304)



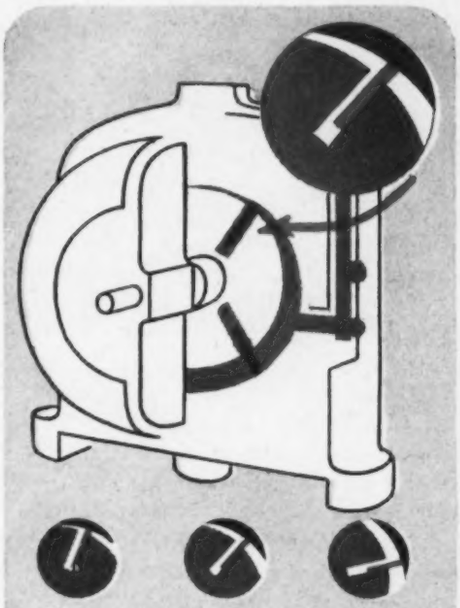
UTTER SIMPLICITY, MASTERFULLY DEVELOPED

. . . the Gast Vacuum Pumps (to 28 in.), Compressors (to 30 lbs.), and Air Motors (to 1 h.p.)

Gast design shows what can be done by working *WITH* principles instead of settling one design problem by creating two new ones. And Gast manufacturing exemplifies the old truism about doing one thing well.

The result is a line of rightly-priced, service-free vacuum pumps, compressors and air motors of the kind manufacturers appreciate having as original equipment on their machines, and users like to find there.

If you do not use air power but *COULD*, to better advantage, or if you already use air power, Gast, surely, will prove to be your better selection from both the original cost and the performance-and-maintenance standpoints, as it has for increasing scores of makers of a wide variety of machines and equipment. Avail yourself of Gast application experience, have Gast simplicity and faithful performance working for you ever after! GAST MANUFACTURING CORPORATION. 150 Hinkley St., Benton Harbor, Mich.



Vanes: Self-seating . . self-adjusting . . springless. Centrifugal force holds them against cylinder wall. They "work without works". . . Continuous, non-pulsating flow. . . More air per pound of weight, more air per horsepower. . . Forced-air cooling: long life, oil economy, no hot-oil odor . . . Automatic shaft seal: no packing, no leaking, no adjusting.

ENGINEERING TEST OFFER —So You Can SEE IF YOU'RE MISSING SOMETHING!

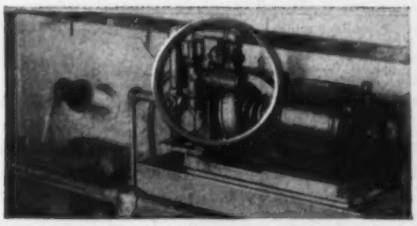
Simply write our Engineering Department and explain the operation you think air might handle, or describe the job air is already doing for you. Our Engineering Department will study your problem, select or design a Gast unit to do the specified work at less cost or at greater efficiency or both. Then, **without cost** or obligation, the recommended unit will be shipped to you for your performance tests.

GET THIS IDEA-CATALOG

It not only tells how Gasts are built and all about them, but suggests uses that may not have occured to you. Write for it; no charge or obligation!

GAST ROTARY

VACUUM PUMPS · AIR COMPRESSORS · AIR MOTORS



Supplying Air to Industrial Oil Burner

Vacuum Service on a Labeling Machine

8413

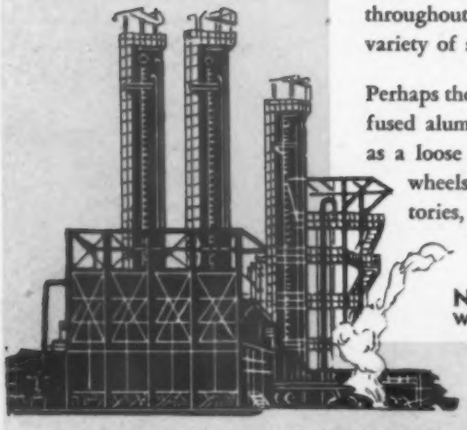
The Chemical Industry, Too Uses ALUNDUM*...

For CATALYST SUPPORTS in Vital Processes

IN the complicated chemical processes used on such a gigantic scale to produce industrial alcohol, synthetic rubber, petroleum by-products and the like, various catalysts play a prominent part. Chemical engineers needed a product that would hold these catalysts while they did their job — a porous material that would absorb them and also withstand the high temperatures encountered in the processes.

Norton research supplied the answer with ALUNDUM Catalyst Supports — granules, pellets, rings and aggregates of ceramically-bonded fused alumina. Today they are in use throughout the chemical industry in the wide variety of sizes and types required.

Perhaps there are many ways that ALUNDUM fused alumina can serve you — in grain form as a loose abrasive, or bonded into grinding wheels and sharpening stones, into refractories, porous mediums, and non-slip tiles and treads for floors and stairs.



NORTON COMPANY
WORCESTER 6, MASS.

*T. M. Reg. U. S. Pat. Off.

ABRASIVES — GRINDING WHEELS — GRINDING AND LAPPING MACHINES

NORTON

REFRACTORIES — POROUS MEDIUMS — NON-SLIP FLOORS — NORBIDE PRODUCTS
BEHR-MANNING DIVISION PRODUCTS: COATED ABRASIVES AND SHARPENING STONES

Elsie Lounsbury has been named Purchasing Agent for Timber Structures, Inc., Seattle, Washington, succeeding John Gallant who resigned.

John Gallant has been appointed Purchasing Agent for Commercial Lumber Co., Tacoma, Wash., a division of Van Dyn Enterprises of Portland, Ore.

J. R. Moorhead has been appointed Assistant Treasurer in Charge of Purchasing of the Simonds Worden White Company, Dayton, Ohio, succeeding Robert G. Harding who has been named Traffic Manager. Formerly he was Purchasing Agent for the Safety Grinding Wheel and Machine Co., Springfield, Ohio. Richard P. Evans, who was purchasing agent at the beginning of the war, and who served in the army, has recently returned from Japan and has been made assistant to Sales Manager Nels G. Johnson, of the Knife Division.

Paul V. Goodman has been appointed Director of Purchases, Davey Compressor Co., Kent, Ohio. Mr. Goodman has been a member of the Davey organization since 1929, with the exception of the period from 1935 to 1939 during which he served as Purchasing Agent for the Ohio State Highway Department.

Paul V. Goodman

General Chemical Company announces that effective January 2, 1947 the purchasing of all equipment and accessories required for construction and maintenance purposes, including construction contracts, will be handled directly from General Chemical Company, Purchasing Department, 1100 Line St., Camden, N. J.

H. G. Falbush has been appointed Purchasing Agent for the J. H. Day Company, Cincinnati, Ohio, succeeding Frank Herberg.

Edward L. Keenan has been elected Vice President and Purchasing Agent of United Engineers & Constructors Inc., Philadelphia, Pa. Mr. Keenan has been Purchasing Agent of the company since 1928. Prior to his connection with United Engineers he was engaged in purchasing, estimating and valuation with Day & Zimmermann Engineering & Construction Co., from 1923 to 1928, and in estimating and cost work with Merchants Ship Building Co., Chester, Pa., from 1917 to 1923.

(*Please turn to page* 306)

Easier way to better piping ...CRANE Supplies Everything

Why do it the hard way when you can simplify every step of piping jobs—from design to erection to maintenance work. Specify Crane equipment—the truly complete line that not only includes everything you need, but assures the quality you want in every item.

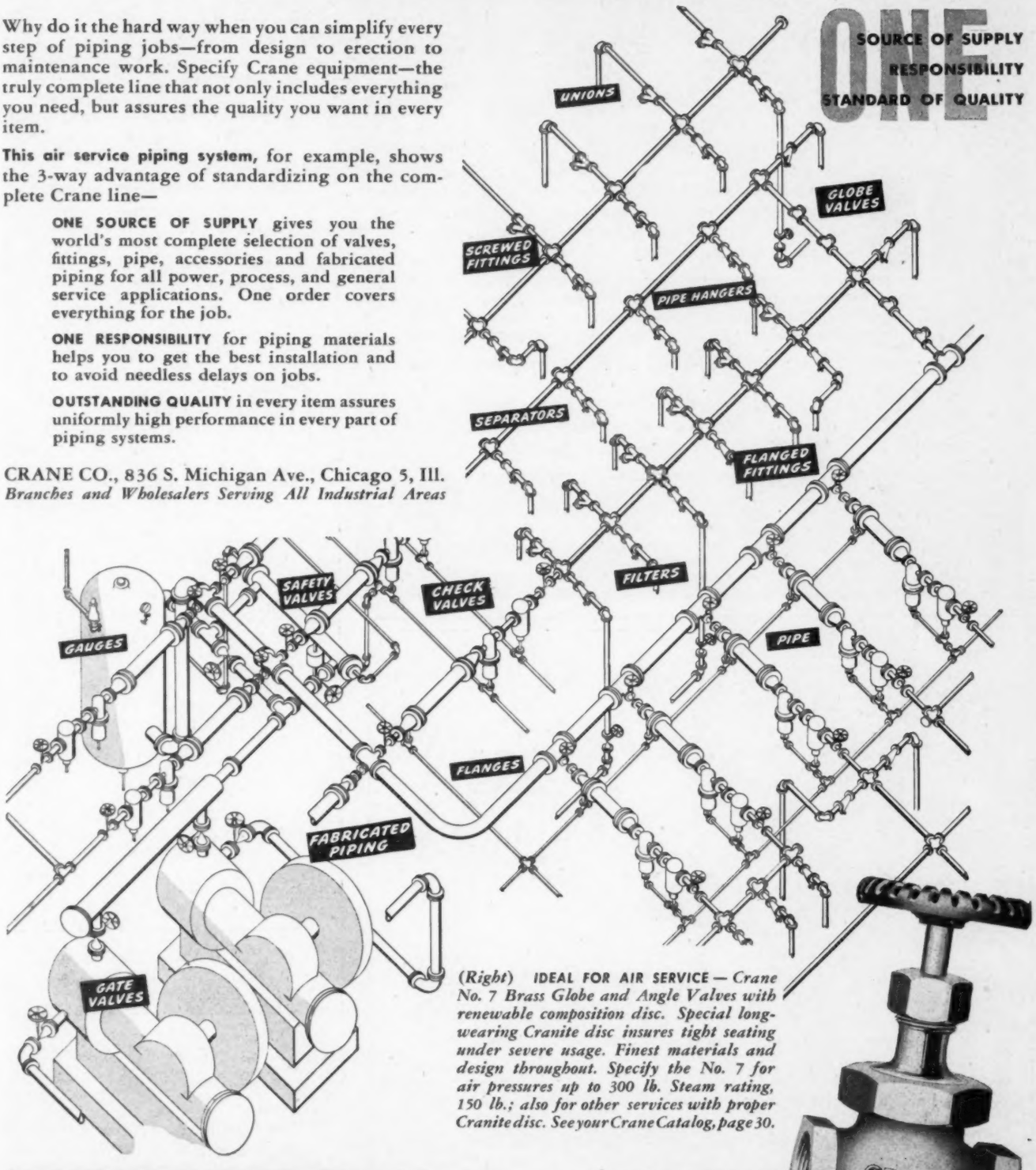
This air service piping system, for example, shows the 3-way advantage of standardizing on the complete Crane line—

ONE SOURCE OF SUPPLY gives you the world's most complete selection of valves, fittings, pipe, accessories and fabricated piping for all power, process, and general service applications. One order covers everything for the job.

ONE RESPONSIBILITY for piping materials helps you to get the best installation and to avoid needless delays on jobs.

OUTSTANDING QUALITY in every item assures uniformly high performance in every part of piping systems.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas



(Right) **IDEAL FOR AIR SERVICE** — *Crane No. 7 Brass Globe and Angle Valves with renewable composition disc. Special long-wearing Cranite disc insures tight seating under severe usage. Finest materials and design throughout. Specify the No. 7 for air pressures up to 300 lb. Steam rating, 150 lb.; also for other services with proper Cranite disc. See your Crane Catalog, page 30.*

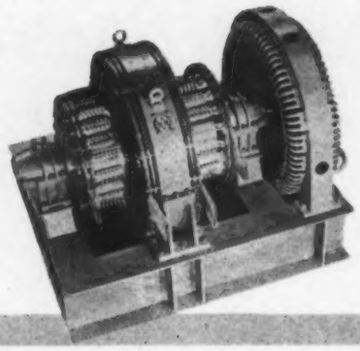
EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

H-VW-M
GENERATORS
FEATURING
Versatility



FEATURES built into H-VW-M generators qualify them for many types of service, appeal alike to electroplaters, anodizers, electrotypers, producers of electrolytic chemicals, metal refiners. Among these features are:

Core-ventilated laminated armatures of non-aging silicon steel • Low-loss laminated fields • Generous sleeve-type bearings with oil-rings — for long, quiet operation, easy maintenance • Wide voltage range or stable voltage characteristics, as needs require.

A 6-volt, 15,000 ampere H-VW-M Motor Generator Set is shown above.

H-VW-M generators are built in standard voltage ratings of 6, 9, 12, 15, 18, 25, 30, 40, 50; in ratings up to 25,000 amperes.

Write for H-VW-M Generator Bulletin

OHANSON-VAN WINKLE-MUNNING COMPANY
MATAWAN, NEW JERSEY
Manufacturers of a complete line of electroplating and polishing equipment and supplies
Plants: Matawan, New Jersey • Anderson, Indiana
Sales Offices: Anderson • Chicago • Cleveland • Dayton • Detroit
Grand Rapids • Matawan • Milwaukee • New Haven • New York • Philadelphia
Pittsburgh • Rochester • Springfield (Mass.) • Stratford (Conn.) • Syracuse

OHANSON VAN WINKLE MUNNING CO. MATAWAN NEW JERSEY U.S.A. SINCE 1820

THERE ARE MANY STARS...
but only ONE

UNBRAKO
Reg. U. S. Pat. Off.

Pat'd and Pats. Pend.

SOCKET SET SCREW with the knurled cup point

And that knurled cup point digs-in and holds fast—regardless of the most chattering vibration. But still,—it can be backed-out and used over and over again!

"Unbrako" and "Hallowell" Products are sold entirely through distributors.

Knurling of Socket Screws originated with "Unbrako" in 1934.

OVER 43 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.
JENKINTOWN, PENNA., BOX 590 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

William Borneman, Jr. has been named Assistant Purchasing Agent, Hickok Electrical Instrument Co., Cleveland, Ohio, by Frank Sawonik, Purchasing Agent, replacing Don Ross who has gone into sales work.

W. S. Tomlinson, city engineer, Columbia, South Carolina, was named by the city council to serve as City Purchasing Agent in addition to his other duties. The newly created purchasing department which commenced operation January 1st, will remain on a probationary status for six months, at which time the office will either be declared permanent or be abolished. In the meantime all city purchases will be made through Mr. Tomlinson's office by requisition

Lawrence E. Hilts, for many years Purchasing Agent for Barnes-Gibson-Raymond Division, Detroit, Mich., has been named factory manager of the same company. Mr. Hilts retains his title of Director of Purchases in addition to his other duties. Paul Page has been named Assistant Purchasing Agent.

Harry E. Lorenz has been appointed Purchasing Agent, Carnegie-Illinois Steel Corp., Pittsburgh, Pa., according to an announcement by R. L. Van Cleve, Director of Purchases. Mr. Lorenz has been associated with U. S. Steel subsidiaries since 1922 when he joined the Illinois Steel Company as a buyer. Prior to his present appointment he was Assistant Purchasing Agent of the Chicago district. **C. H. Baringer** and **F. G. Buchheit** have been named Assistant Purchasing Agents.

B. J. Apperson has been named Purchasing Agent, Plumbing and Allied Products, Inc., Denver, Col. Previously he was associated with the Phelps Dodge Corp., as a buyer under C. C. Wolf, Purchasing Agent. He is succeeded in that capacity by Arthur Henson.

Harold A. Boyd, since 1942 assistant sales manager, Olson Mfg. Co., Boise, Idaho, has been appointed Idaho State Purchasing Agent by C. A. Robins, Governor-elect.

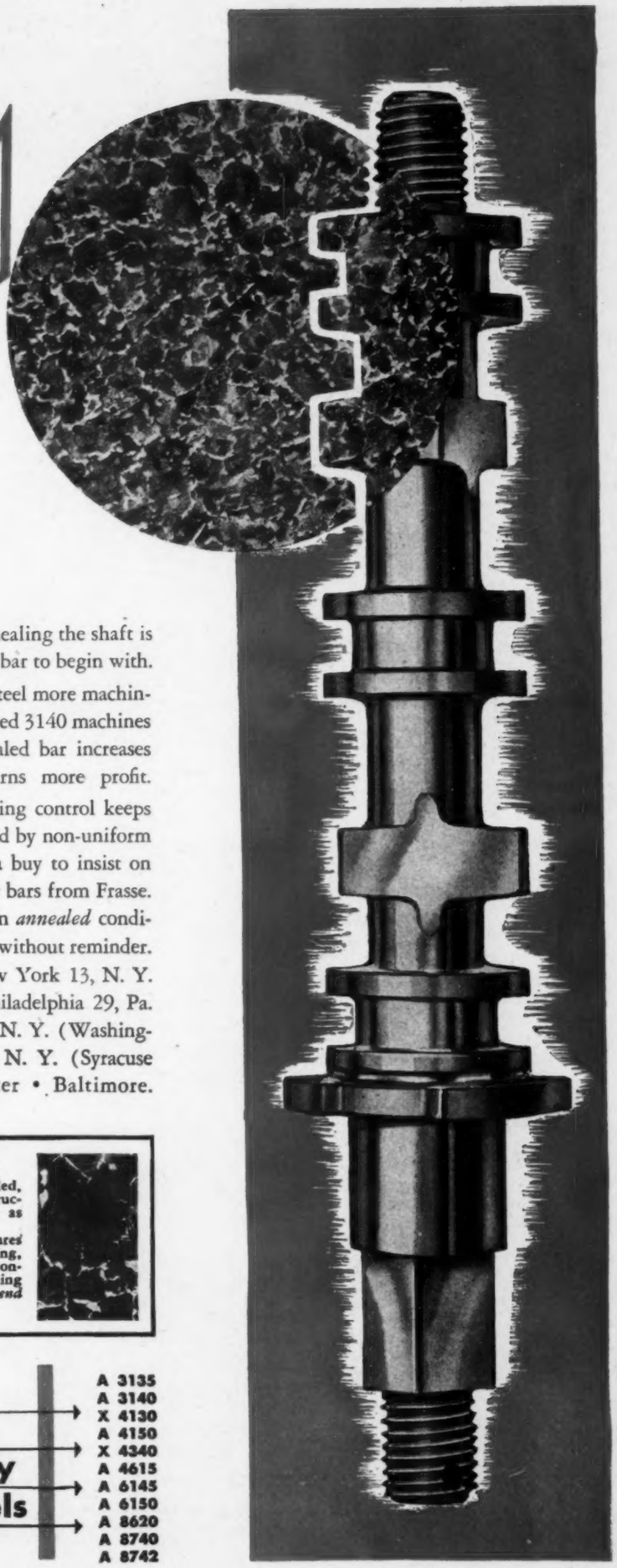
AMONG THE COMPANIES YOU BUY FROM

Mason City, Iowa — Container Corporation of America, Chicago, Ill., has appointed Gerald L. Driscoll as special representative to the dairy and locker plant industries in charge of the Mason City office, succeeding C. W. Frese, resigned. He will serve Iowa, southwestern Wisconsin and eastern Nebraska.

Chicago, Ill.—The offices of Hewitt-Robins Inc., have been combined with the moving of the Robbins Conveyor Division office from 37 West Van Buren St., to that of the Hewitt Rubber Division at 7 South Dearborn St.

(*Please turn to page* 308)

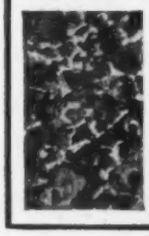
the hidden bargain in alloy steel



This camshaft is cut from alloy bar stock. Cost of annealing the shaft is less than 1/4 of a cent—because it's cut from *annealed* bar to begin with.

See the rest of this bargain! Annealing makes the steel more machinable . . . and easier on the tools, too. In this case, annealed 3140 machines 14% faster than the same grade "as rolled". Annealed bar increases production, prolongs life of expensive tools, earns more profit.

It gives you *steadier* production, to boot. Annealing control keeps quality the same from bar to bar—an advantage lacked by non-uniform "as rolled" bars. For the trifling cost involved, it's a buy to insist on *annealed* alloy bars, just as it makes sense to get your bars from Frasse. Since the appropriate grades are stocked by Frasse in *annealed* condition only, you get the "annealing bargain" every time without reminder. Peter A. Frasse and Co., Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Radcliff 5-7100) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • 157 Richmond Avenue, Syracuse 4, N. Y. (Syracuse 6-2103) • Jersey City • Hartford • Rochester • Baltimore.



For the Technical Minded:

Both photomicrographs (x 100) are hot rolled, 2¼" rd. AISI A3140 for comparison. Microstructure to left: annealed to 197 Brinell, right: as rolled, 229 Brinell.

Latest Frasse chart shows heat treat procedures for 60 alloy steels. Salient data for normalizing, annealing, hardening and carburizing is condensed on handy check chart. Also covers cooling mediums, tempering ranges, precautions. *Send for a free copy today.*

FRASSE for Alloy Steels

A 3135
A 3140
X 4130
A 4150
X 4340
A 4615
A 6145
A 6150
A 8620
A 8740
A 8742

Even including Alabaster Blondes

Yes, there's practically *nothing* that can't be cleaned *better* with a Turco product—even including alabaster blondes. For Turco scientists, through famous Turco Surface Chemistry*, have developed hundreds of *specialized* Industrial Cleaning Compounds and Processes for *every* type of business, industry and institution. Learn more about Turco—and what Turco can do to solve *your* cleaning problems. There's a skilled Turco Serviceman in your neighborhood. Call him *today*.

**The scientific application of all the factors in cleaning to a specific problem.*

TURCO

INDUSTRIAL CLEANING COMPOUNDS

TURCO PRODUCTS, INC. Main Office & Factory: 6135 S. Central Ave., Los Angeles 1
Offices & Factories: 125 W. 46th St., Chicago 9 - 1606 Henderson St., Houston 1, Texas
New York Office: 21 West Street, New York 6 - Offices & Warehouses in All Principal Cities
D. W. Deane & Company Limited, 751 Victoria Square, Montreal 1, Canada

Pittsburgh Steel Company, Pittsburgh, Pa., announces changes in its general sales organization. Carl L. Zak has been appointed general manager of sales, and

Carl Zak

L. A. Ver Bryck assistant general manager of sales. Joseph G. Smith has become New York district manager of sales; Walter D. Schlundt, district sales manager in Pittsburgh; and Edward L. Dull, district sales manager at Detroit.

Mishawka, Ind.—United States Rubber Co., Rockefeller Center, New York City. Charles W. Pennington has been appointed sales manager, clothing and coated fabrics, succeeding William F. Cairns who is retiring. He will make his headquarters at the Mishawka plant. Herbert S. McWhorter succeeds him as sales manager of the Pacific Coast division, and Louis J. Healey has become district manager of the San Francisco branch, footwear division.

West Coast—Joseph T. Ryerson & Son, Inc., Chicago, steel distributors, announce the appointment of Freeman X. Kinzie as west coast representative, bearings and babbit division, succeeding O. K.

Freeman X. Kinzie

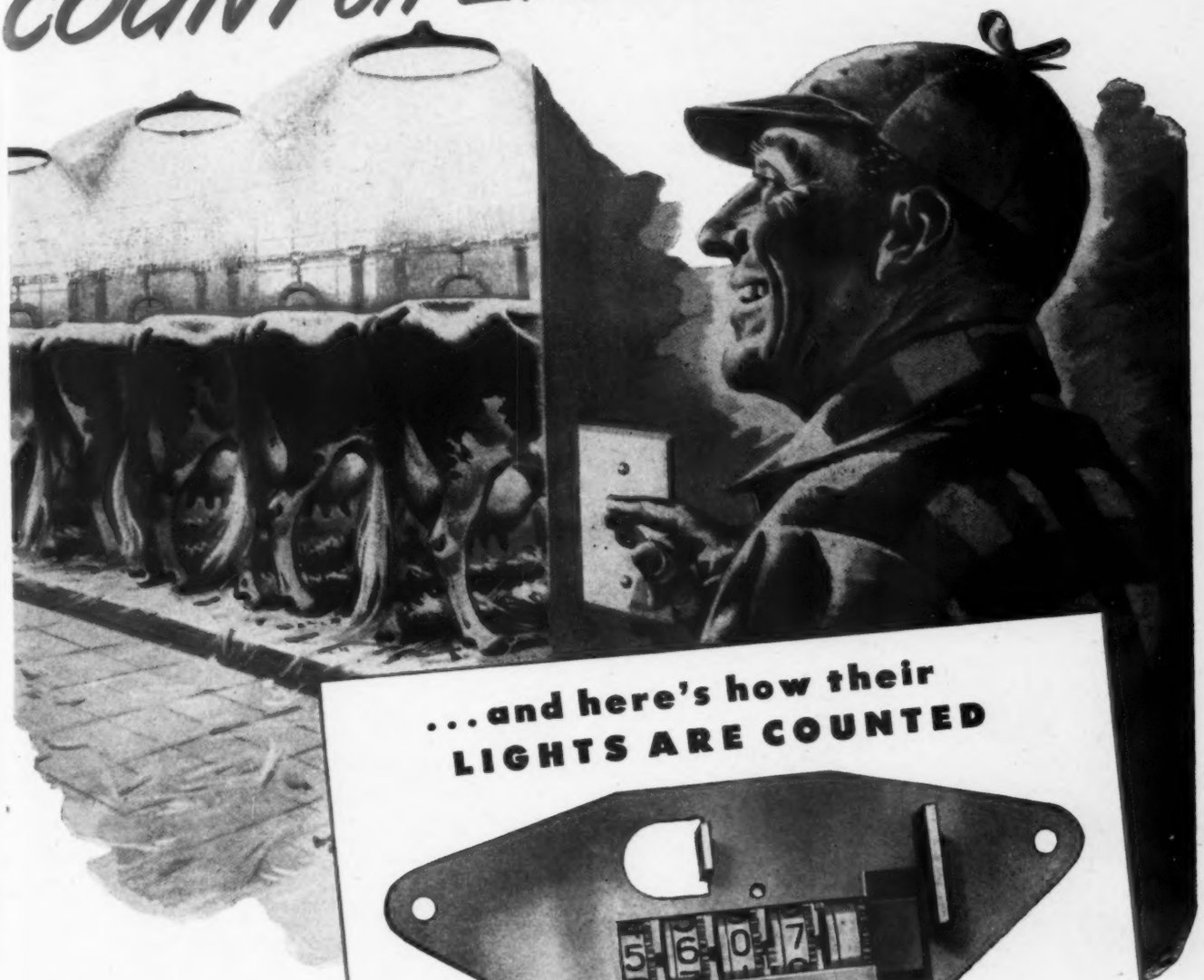
Graef who has resigned. Mr. Kinzie will specialize in the sales of Ryertex nonmetallic bearings and Glyco babbit metals, making his headquarters at the company's Los Angeles plant.

Cincinnati, Ohio—Ward Leonard Electric Co., Mount Vernon, N. Y. has appointed Storer and Schemm, Transportation Building, 307 East Fourth St., industrial representative for southern Ohio, eastern Kentucky, western Virginia and Clark and Floyd counties, Indiana.

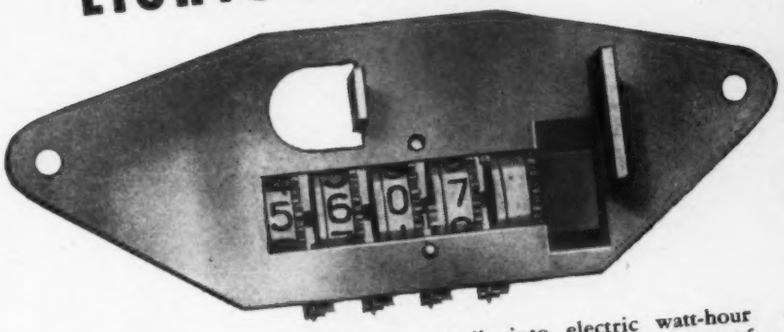
(*Please turn to page* 310)

NOW... THOUSANDS OF FARMERS CAN ALWAYS

COUNT on LIGHTS



...and here's how their LIGHTS ARE COUNTED



Veeder-Root Watt-Hour Counter, built into electric watt-hour meters. This counting device gives the farmer direct reading of current consumption in number of watt-hours.

Lanternlight for chores always appealed to poets — but not to practical farmers. And now, in certain sections of the country, the instant command of adequate electricity has lightened the farmer's work in more ways than one . . . and put an end to a dread fire-hazard, too.

Extended to farmers in outlying districts, the comfort, safety and greater work-capacity of electric light and power have had a whole lot to do with today's amazing farm productivity.

And the whole deal, for the farmer, is as simple as this: Once a month he takes a *direct reading* from his electric meter, notes the reading on a postcard, mails the card, soon gets a bill. And what he reads is the Veeder-Root Watt-Hour Counter, built into the large meter as an integral part. This is another instance of the infinite ways in which Veeder-Root *Count*rol can be designed into any type of product as an added advantage in use. More than likely, Veeder-Root *Count*rol can be designed into your product . . . in the form of a standard counter, or one developed specially for your particular need. It's well worth finding out — and *you can count on that!*

The Counting Home of Industry

VEEDER-ROOT INC.

Hartford 2, Connecticut

In Canada: Veeder-Root of Canada, Ltd., 955 St. James St., Montreal 3.
In England: Veeder-Root Ltd., Dickinson Works, 20 Purley Way, Croydon, Surrey.

CORBIN **A name famous in the metalworking industry**

CORBIN **SCREW**... Known wherever fastening devices are used, for excellence and uniformity in Wood Screws, Sheet Metal Screws, Machine Screws, Stove Bolts — both CORBIN-PHILLIPS and CORBIN-Slotted — also Nuts, Drive Screws, Set Screws, Escutcheon Pins ... Chain.

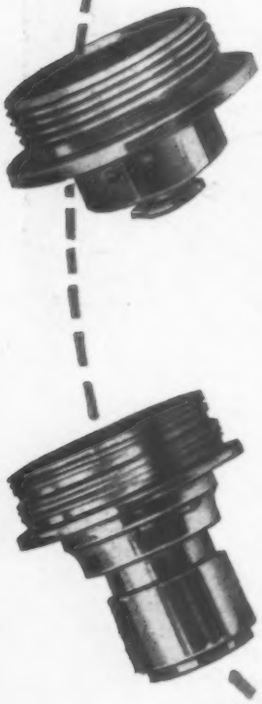
CORBIN **SCREW MACHINE SPECIAL PRODUCTS MILLED FROM BAR**

Known throughout the metalworking industry as one of the largest producers of special products milled from bar or cold-headed blanks. In over 200,000 square feet of floor space, thousands of machines permit every primary and secondary operation needed to assure full compliance with specifications, plus rapid and economical production.

CORBIN equipment includes hundreds of single- and multiple-spindle automatics ... batteries of grinders for centerless, cylindrical, internal and thread grinding ... solid and open-die headers ... lathes, milling and drilling equipment ... departments specializing in precision rolled thread ... heat-treating, plating, polishing ... all subjected to step-by-step rigid inspection that promotes acceptance and speeds production *for you.*

You know CORBIN ... you know CORBIN-SCREW ... it will pay you to know CORBIN SCREW MACHINE SPECIAL PRODUCTS for the manufacture of small parts, inspected and ready to go into your assemblies.

P-73



CORBIN SCREW DIVISION
The American Hardware Corp.
NEW BRITAIN
CONNECTICUT

CORBIN

COME TO CORBIN FOR SCREW MACHINE *Special Products*

New York, N. Y.—Graybar Electric Co. Herbert Metz succeeds W. J. Drury, retired, as eastern district manager with offices in the Graybar-Varick building,

Herbert Metz

180 Varick Street. He was also appointed a member of the company's executive committee.

New York, N. Y.—Mathieson Alkali Works, 60 East 42nd St., announces the elections of D. W. Drummond as vice-

D. W. Drummond **A. T. Bennett**

president-general manager of sales and of Arthur T. Bennett as vice-president-general manager of operations.

Chicago, Ill.—Kellogg Switchboard & Supply Co., announces the appointment of E. M. Hector to the firm's industrial sales department. He will contact various government agencies.

E. Ohio - W. Penna.—Corbin Screw Division, American Hardware Corp., New Britain, Conn. John T. Foley has been appointed sales representative in the western Pennsylvania and eastern Ohio territory.

Milwaukee, Wisc.—Link-Belt Company, Chicago, Ill., announces the opening of a new sales office in the Century Building, 808 North Third St. William M.

W. M. Hufnagel

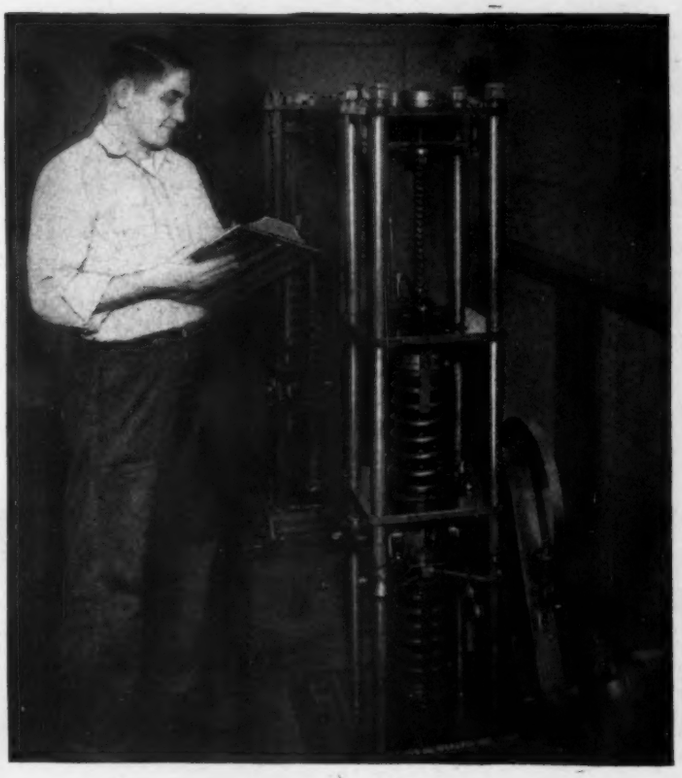
Hufnagel, district sales manager, will be in charge. He will be assisted by H. B. Johnson and F. E. Sweeney.

(*Please turn to page* 313)

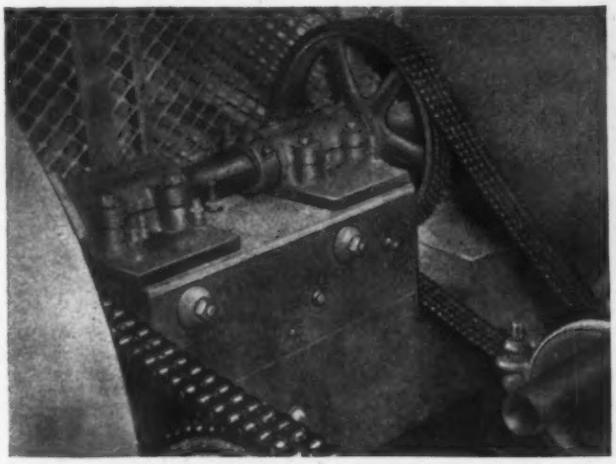
do you know Roller Chain...

is actually elastic!

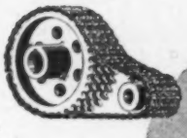
1 AND HERE'S WHAT that means to you. Where your equipment is subjected to momentary overloads and sudden strains, the inherent elasticity of roller chain will help absorb those damaging shocks and protect your equipment.



2 WE'VE ACTUALLY PROVED that roller chain is elastic. With this testing machine, designed and built by our engineers, we stretch this small section of Baldwin-Rex Roller Chain about ⅛-inch with each load application. We do this more than 10,000,000 times. Each time the chain must withstand the load and retract to its original length in order to meet our rigid specifications.



3 TAKE THIS CALENDER DRIVE The elasticity of that Baldwin-Rex Chain enabled it to withstand the severe shock loads as lumps of crude rubber are squeezed through the rolls. It's been in service more than 30,000 work hours and is still going strong. Previous drives gave only 6 months' service. That's real proof!



You can simplify replacement, cut costs and help speed deliveries by specifying standard roller chain. Your Baldwin-Rex man will be glad to give you all the facts and help you with your application problems. Call him or write us direct.

BALDWIN·REX

ROLLER CHAINS

BALDWIN-DUCKWORTH DIVISION OF CHAIN BELT COMPANY

366 Plainfield Street, Springfield 2, Massachusetts

Here's another reason why Wirebound users

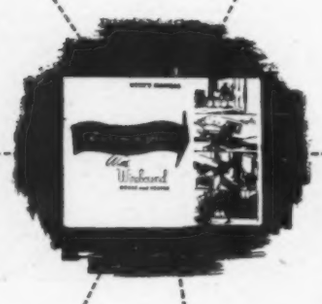
ship more safely . . . more efficiently . . . and at lower cost.

User's Manual covers basic carloading instructions

Wirebound Boxes and Crates, which combine the lightness of wood with the strength of steel, are scientifically designed to carry products safely at minimum cost. But in addition to providing careful design and good construction, every Wirebound manufacturer follows through—with details of handling, assembly and shipping techniques to help the user attain higher shipping room efficiency and lower costs.

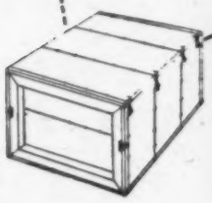
From the vast experience of all Wirebound manufacturers these details have been gathered and printed under the title "Delivering the Goods"—a User's Manual that will, in these days of continued container shortages, be of special interest and assistance to every Wirebound user. This book is published as another Wirebound service to help users ship more safely, more efficiently and at lower cost. You may obtain copies of the User's Manual by writing your regular Wirebound supplier.

Proper assembly and closing methods are illustrated



Helpful Warehousing suggestions are included

Straight-line shipping room assembly methods are described



Wirebound
BOXES & CRATES

Greenfield, Mass.—Threadwell Tap & Die Co. announces the appointment of Paul W. Polk as vice-president and manager. The plant, equipment and as-

Paul W. Polk

sets of Threadwell were acquired by the Sheffield Corp., Dayton, Ohio, last year. It will continue to operate without changes as an independent subsidiary.

Tulsa, Okla.—Kennametal Inc., Latrobe, Pa. Martin Supply Co., 413 South Kenosha St., has been appointed sales agent for the state of Oklahoma.

General Electric Co., Lamp Dept., Nela Park, Cleveland, Ohio, announces changes in its sales district organization and personnel. W. T. Moore, for many years manager of the Southeastern Sales District, has retired. His district now divided

G. E. Park and L. J. Campbell

into two parts, he is succeeded by Glenn E. Park, appointed manager of the Carolinas Sales District, with headquarters in Charlotte, N. C., and L. J. Campbell, named manager of the (new) Southeastern Sales District, with headquarters in Atlanta, Ga.

Philadelphia, Pa.—Jenkins Bros., New York City, has appointed James M. Mar-

James M. Martin

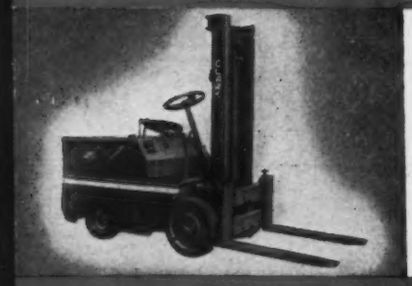
tin branch manager, succeeding Joseph E. Hodgkins who has retired.

(*Please turn to page* 314)

Cut Cost Factors with Clark Tructractors

The New CLARKAT

The Famed CLARKTOR 6



Electric FORK TRUCK

Gas Powered FORK TRUCK

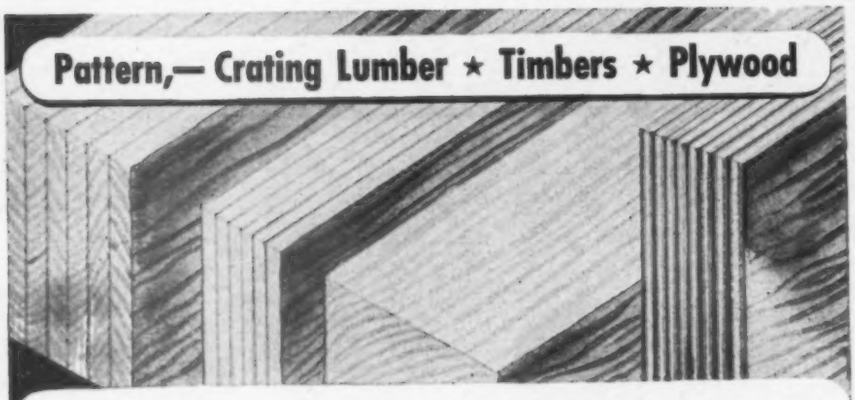
ABOVE EVERYTHING ELSE . . . in the material handling field, Clark Methods and Clark Machines are outstanding, permitting maximum savings in man hours and handling costs. The full story in pictures—"Material Handling News"—is yours for the asking.

CLARK TRUCTRACTOR
Division of CLARK EQUIPMENT COMPANY
BATTLE CREEK, MICHIGAN
OTHER PLANTS – BUCHANAN, JACKSON, BERRIEN SPRINGS, MICHIGAN

Other CLARK Products

FORK LIFT TRUCKS		ELECTRIC STEEL CASTINGS
TOWING, DUMP AND	DRILLS	METAL SPOKE WHEELS
SHOVEL TRACTORS	& GEARS	AXLES & HOUSINGS
RAILWAY TRUCKS		TRANSMISSIONS

Prices on CLARK products will not be advanced in excess of increased costs.



Check Into This Timely Deal: Features 4 scarce items, PLUS the combined facilities of these three great lumber suppliers. Means less red tape. Offers best possibility of getting the lumber you need. Just send your one order to any one of the three addresses below, and it will get the pick of an accumulated supply of lumber, outstanding today in quantity and selection.

UNION WHOLESALE
YOUNGSTOWN 8, OHIO
Phone: 4-4406

DOUGHERTY
CLEVELAND 5, OHIO
WILLOW RANCH, CALIF.
Phone: Diamond 1200

KEYSTONE
PITTSBURGH 3, PA.
Phone: HEmlock 0700

LUMBER COMPANY

Aircraft Wire—tinned or alloy coated and galvanized
Armature Binding Wire—tinned or alloy coated
Belt Hook Wire—tinned, galvanized or alloy coated
Bobby Pin Wire
Brush Wire—round scratch brush, tempered and untempered. High strain white liquor finish
Card Wire—tempered, round, angular, single convex, double convex
Curtain Spring Wire—round, flat
Fish Leader Wire
Flexible Shaft Wire—Music Wire quality
Hard Drawn Spring Wire
Heddle Wire
Hose Reinforcement Wire
Mandolin Wire
Music Wire, bright, tinned or alloy coated
Piano Wire, perfected quality
Rope Wire, bright or galvanized—mild plow, plow, improved plow
Seal Wire
Stainless Steel Wire
Stapling Wire
Stitching Wire
Tire Wire—bronze plated

JOHNSON
STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
NEW YORK AKRON DETROIT CHICAGO LOS ANGELES TORONTO

New York State—Bliss & Laughlin, Inc., Harvey, Ill. Deppen Kline has been appointed Buffalo district sales manager with headquarters at 110 Hopkins St., and a district sales office has been opened in Syracuse, Room 1303, State Tower Building with James D. MacPherson as manager.

Philadelphia, Pa.—Carborundum Company, Niagara Falls, N. Y. announces

John G. Fritzinger

the appointment of John G. Fritzinger as district sales manager, succeeding Willard J. Griffith who has resigned.

St. Louis, Mo.—Hercules Powder Co., Wilmington, Del., Joseph M. Carbonera will serve as Naval Stores sales representative succeeding Frank W. Hoyt who has retired.

New England—Cleveland Tapping Machine, Hartville, Ohio, announces that Central Machinery Co., Boston, will continue to sell its drilling and tapping machines in all New England States except Connecticut, where Melville L. Merrill will continue as representative.

Stanley Tools, New Britain, Conn., announces the appointment of two new salesmen, Theodore and Joel Molchan. Both brothers were with Stanley Tools prior to serving in the armed forces.

Theodore and Joel Monchan

Theodore will travel West Virginia, Virginia, North Carolina, eastern Tennessee and eastern Kentucky. Joel will travel Missouri, Kansas, Nebraska, Colorado and Wyoming as a member of the Chicago sales force.

Minneapolis, Minn.—Kennametal, Inc., Latrobe, Pa., has designated Walter H. Hammond Co., 255 Third Ave., as sales agent for the area comprising Minnesota, North and South Dakota.

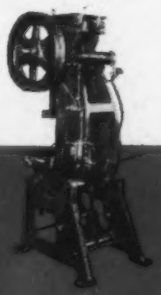
(Please turn to page 316)

YOUR PRESSES *CAN* DO MORE FOR YOU!

It's a simple matter to get (1) SAFER operation, (2) more operator satisfaction and (3) more production from your presses. Just install Schrader Press Controls. Let them put compressed air to work for you—efficiently! Eliminate fatiguing leg movements, keep hands automatically away from danger zone. Thousands of Schrader Press Control Sets are in use in leading plants.

Contact your mill supply distributor or write for Catalog **7** containing details on the various types of Schrader Controls for presses. You'll save money in many ways!

1844 1947



PRESS CONTROLS

OTHER SCHRADER PRODUCTS FOR EFFICIENT AIR CONTROL
Air Valves 2,3,4-way • Air Operated Machine Controls
• Air Operated Press Controls • Quick Acting Couplers
• Blow Guns • Air Ejection Sets • Hydraulic Gauges

Schrader
PRODUCTS
CONTROL THE AIR

A. SCHRADER'S SON, *Division of Scovill Manufacturing Company, Incorporated,* BROOKLYN 17, N. Y.

Save Time!... Cut Costs!...

TALK INSTANTLY

with... **FLEXIFONE**

INTERCOMMUNICATION EQUIPMENT

Give Orders...Get Action! *Gather Information* with **FLEXIFONE**

NO WAITING FOR OPERATORS . . . NO DIALS OR BUZZERS!

Save Time, Money, Steps and Nerves!

Executive decisions and production problems swiftly, clearly carried to the key men in your organization to be executed and solved immediately. FLEXIFONE is quality engineered and built . . . modern and functional in design to meet your demand for a lightning-fast method of intercommunication. Choice of several models with capacities up to twenty connections. Mail coupon today and let free folder show you how FLEXIFONE gives you *Wings for Your Words.*

OPERADIO **FLEXIFONE** INTERCOMMUNICATION EQUIPMENT

Also Manufacturers of Plant Broadcasters for music and voice paging.

OPERADIO MANUFACTURING COMPANY

DEPT. P. 2, ST. CHARLES, ILL.

Please send free literature as checked:

- ☐ FLEXIFONE Intercommunication
- ☐ Plant Broadcasting
- ☐ Make appointment to discuss our needs

Name _____

Address _____

City _____ State _____

FREE! *Pin to Your Letterhead*

INDUSTRIAL DEVELOPMENTS

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill., manufacturer of Thor portable pneumatic and electric tools, announces a $1,000,000 expansion of its main works at Aurora, Ill. The expanded facilities are planned for production of new Thor products in both the automotive and farm markets, including electric saws, high frequency electric tools, pneumatic hammers, valve refacers and hard seat grinders.

United Wallpaper, Inc., Chicago, Ill., announces the establishment of its general and executive offices in the tower of the Merchandise Mart, bringing together all administrative and studio personnel of the home office.

Portable Products Corp., Pittsburgh, Pa., has purchased the Great Western Fuse Co., and the LaMar Indicating Fuse Corp., both of 7633 Susquehanna St., Pittsburgh. They will continue their present operations as subsidiaries.

Westinghouse Electric Corp., Pittsburgh, Pa., has purchased 27 acres in Little Rock, Arkansas, for the construction of an incandescent lamp manufacturing plant. The company has also received final approval from the WAA for the purchase of the plant at Vanport, Beaver County, Pa., operated during the war by the Curtis Wright Corp. This plant will be used for the manufacture of De-Ion circuit breakers, motor starters, and safety switches.

Russell, Birdsall & Ward Bolt and Nut Co., Port Chester, N. Y., announces the acquisition of the plant and other assets of the Cooper Screw Mfg. Co., Los Angeles, Calif. Charles D. Brenner, formerly in charge of the Los Angeles office of RB&W, will become manager of sales for the new plant with R. A. MacDonald, from the RB&W Port Chester plant, serving as plant manager.

Thermoid Company, Trenton, 6, N. J. is constructing a new manufacturing plant at Nephi, Utah. The plant will be known as Thermoid Western Co., and will be devoted to the production of rubber products such as V-belts, fractional horsepower belts, industrial V-belts, conveyor and transmission belting, and oil-field products, wrapped hose products, and moulded hose products.

Reynolds Metals Co., Louisville, Ky., announces the acquisition of the government-owned aluminum rolling mill, Newark, Ohio, from the W.A.A. under a five-year lease with an option to purchase. The plant, built during the war at a cost of $23,200,000, is designed to produce ten million pounds of aluminum blooms and 15 million pounds of aluminum rods per month.

(*Please turn to page* 318)

ALOYCO Stainless Steel Valve Success Is Due to 2 Primary Factors

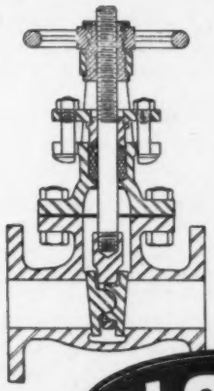
1. Wide Selection of Corrosion-Resisting Alloys
2. Excellence of Design and Construction

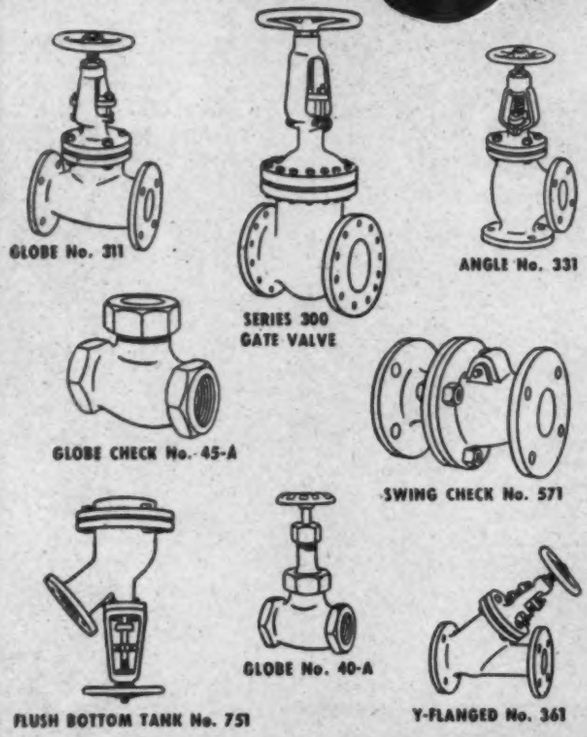
ALOYCO Valves and Fittings are made in a wide variety of stainless steels and other corrosion-resisting alloys. Each of these differs from all others in relative resistance to various corrosive fluids, under different conditions of temperature and concentration. It has taken us many years of specialization in the manufacture of corrosion-resisting valves, exclusively, to gain the experience which enables us to recommend the *one best alloy* for any specific application.

Of equal importance with the selection of the correct alloy, is the quality of design and construction of the valve. In pattern shop, foundry and machine shop, particularly, corrosion-resisting alloys require very different handling from all other metals. Here again, our concentration on corrosion problems makes Aloyco Valves distinctive for mechanical excellence. You get more out of Aloyco Valves, because we put more into them. Consult us on your requirements.

ALOYCO GATE VALVE NO. 111

• This popular valve has double-disc, ball-and-socket type wedges that are free to rotate and are non-fouling in any position. The design insures tightness on both seats and permits easy repairs.





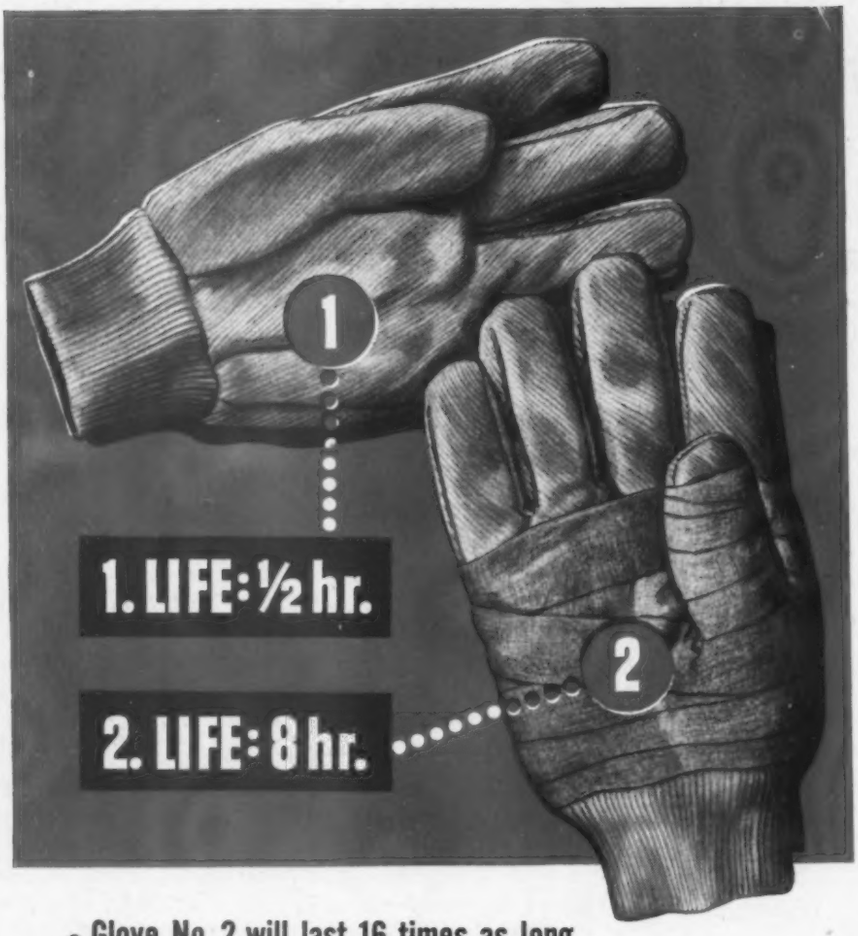
ALOYCO

STAINLESS STEEL VALVES AND FITTINGS

GATE, GLOBE, Y, CHECK, TANK, SAMPLING AND V-PORT VALVES
SCREWED, FLANGED AND WELDING FITTINGS

ALLOY STEEL PRODUCTS COMPANY, INC.

1307 WEST ELIZABETH AVE. • LINDEN, N. J.



• Glove No. 2 will last 16 times as long on a grueling job because it has extra protection

That's what a Chicago die casting firm discovered when it called in a Bauer & Black Technical Consultant for help. Gloves used in handling rough castings were wearing out in half an hour! The Consultant recommended wrapping them with Industrial Adhesive Tape No. 270.

On trial, the wrapped gloves lasted 8 hours! On other jobs, glove life was extended from two to thirty days. What's more, the workmen's hands were spared, production was speeded and savings mounted.

HOW CAN TAPE SERVE YOU?

If you have a "protection" problem—or a packaging, weatherproofing, insulating, or bundling problem—it's a good bet a Technical Consultant can help you iron it out, free! Industrial Adhesive Tape serves so *many* uses, and hundreds of industries have benefited by this free service. To have him call, write Dept. 92 today—and don't forget to ask for our free monthly Automotive News Letter; you'll enjoy it.

Products of

BAUER & BLACK

Division of The Kendall Company, 2500 S. Dearborn St., Chicago 16

Industrial Adhesive Tape

PRESSURE SENSITIVE

Production Short Cuts to Reduce Costs • Research to Speed and Improve Methods

The Brown Instrument Division of Minneapolis-Honeywell Regulator Co. has opened a new branch office at 117 West Eighth Street, Tulsa, Oklahoma. R. P. Walker is branch manager in charge.

Goodyear Tire & Rubber Co., Akron, Ohio, announces the initiation of a $1,850,000 modernization and expansion program at its Jackson, Michigan, plant.

Paisley Products, Inc., Chicago, 16, Ill., has purchased the Lignotite Company, manufacturers of wood adhesives and preservatives, formerly located at 882 Milwaukee Ave., Chicago, 22.

Heyden Chemical Corp., New York, N. Y. announces a change of address for its Chicago office, which has now moved to 20 North Wacker Drive. F. A. Degner is in charge.

National Oil Products Co., Inc., Harrison, N. J. Board of directors voted to change the company's name to Nopco Chemical Company, subject to approval of stockholders at their annual meeting in March. Reason for the proposed change is the fact that many of the company's products, which include various chemical products employed in numerous industrial processes, metallic soaps, etc., are marketed under the "Nopco" trade name.

Lindberg Steel Treating Co., Chicago, Ill., announces the opening of a branch plant at 620 Buffalo Road, Rochester, N. Y.

Celanese Corporation of America, New York, N. Y., announces the addition of $25,000,000 to its cash reserves through the private sale of debentures, to be used to further a long range plant expansion program in the corporation's three major fields of operation, synthetic textiles, chemicals and plastics.

H. K. Porter Company, Inc., Pittsburgh, Pa.., is moving its two Quimby Pump manufacturing operations from Newark and New Brunswick, N. J. to be centralized in the the company's plant at 49th & Harrison Sts., Lawrenceville, Pa.

Hydall Paint & Varnish Co., New York, N. Y. has established the Roberts Paint Corp. to operate as a parent company directing the research, manufacturing, and marketing operations of Hydall Paint & Varnish Co., Jey Arr Lead Co., Bohner Varnish Co., and other divisions now being organized.

Hinde & Dauch Paper Co., Sandusky, Ohio, announces the beginniing of operations of its new factory at 70 Grove St., Watertown, Mass. Sales and general offices have been established at the new location.

Link Belt Co. Pacific Division, Seattle, Wash., manufacturers of conveying and power transmission machinery, have completed and are now occupying newly built plant at Sixth Ave. South & Hinds St., Seattle.

(*Please turn to page* 320)

Specify MO-MAX HIGH SPEED STEELS *for all of your* CUTTING *and* TURNING TOOLS

Because only MO-MAX

GIVES YOU *ALL* THESE ADVANTAGES...

1. MO-MAX has superior cutting qualities.
2. The machinability of MO-MAX is unexcelled.
3. MO-MAX is economical. Its specific gravity is about 8% less than that of 18% tungsten steel.
4. MO-MAX is available in a standardized composition; also in cobalt and high vanadium varieties for special high speed steel requirements.
5. For 14 years MO-MAX has demonstrated its superiority in all types of cutting tools.

Learn all the facts! **Send for your copy of the MO-MAX Handbook, sixth edition. Get the full story about this remarkable steel, including easy-to-follow instructions on heat treating.**

THE CLEVELAND TWIST DRILL COMPANY

1256 East 49th Street • Cleveland 14, Ohio

Buyer's Guide to Brands of MO-MAX

"LMW"	Allegheny Ludlum Steel Corporation
"MOHICAN"	Atlas Steels Limited
"BETHLEHEM HM"	Bethlehem Steel Company
"MO-CUT"	Brnabura Alloy Steel Corporation
"STAR MAX"	Carpenter Steel Company
"MOLITE M-1"	Columbia Tool Steel Company
"REX T-MO"	Crucible Steel Company of America
"DI-MOL"	Henry Disston & Sons, Inc.
"HI-MO"	Firth-Sterling Steel Company
"REX T-MO"	Halcomb Steel Company
"MOGUL"	Jessop Steel Company
"TATMO"	Latrobe Electric Steel Company
"MIDMAX"	The Midvale Company
"S. T. M."	Simonds Saw & Steel Company
"MO-TUNG"	Universal-Cyclops Steel Corporation
"V-N-2"	Vanadium-Alloys Steel Company
"VUL-MO"	Vulcan Crucible Steel Company

Now . . . Safer Stamping at Lower Cost with . . .

"Nu-Grip*" STAMPS

LETTERS
FIGURES
SYMBOLS

- New Design gives positive finger grip.
- Grip holes of exact point for perfect balance.
- Give workmen "feel of security" when stamps are struck by severest hammer blows.
- Available in sizes from 1/32" to 1".
- Write for data and prices.

*Patent applied for

Stamps are made of "Safety" Mecco alloy steel . . . on heavy duty blanks for all stamping applications.

M.E. CUNNINGHAM CO.
SAFETY STEEL STAMPS

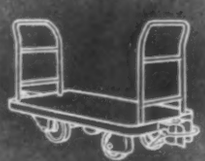
154 E. CARSON STREET PITTSBURGH, PA.

EWC WHEELS

Engineered for YOUR Product

There is a wide variety of EWC wheels and axles for every type of mobile equipment . . . one or several may be ideally suited to your product. For unusual wheel problems, we offer you a complete engineering service, with a thoroughly experienced staff and unexcelled facilities. Write today for complete information.

EWC
Industrial Trailers



Model No. 1002
Caster Trailer

Model W-3
3-Ton Capacity

Model WP-5
5-Ton Dump Trailer

ELECTRIC WHEEL CO., Quincy, Illinois, Est. 1890

Blue Ridge Pressure Castings, Inc., brass die castings, announces the commencing of operations in Leighton, Pa.

Steelware Mfg. Corp., Hawthorne, Calif., formerly known as Steel Products Mfg. Co., Los Angeles, Calif., has resumed production in its new $100,000 plant. The company which manufactures waste baskets, dust pans, tool boxes, and other sheet metal products, plans to expand its lines to include office equipment, janitor supplies and products utilized in home construction.

B. F. Goodrich Company, Akron, Ohio, has reopened its crude rubber purchasing offices in Singapore, Straits Settlement, Malaya, with George M. Naylor as managing director, according to an announcement by E. A. Stevens, manager of crude rubber purchasing. The Singapore office has been closed since the Japanese overran Malaya in 1942.

Monsanto Chemical Company, St. Louis, 4, Mo., is constructing a new pilot plant costing an estimated $175,000 to further plastics research at the company's Chemical Plastics Division in Springfield, Mass.

Morningstar Nicol, Inc., New York, announces plans for improvement of the two buildings recently purchased in N.Y.C. and occupied by a subsidiary, Paisley Products, Inc., manufacturers of industrial adhesives and textile finishes. In addition to office and laboratory modernization, new equipment will, it is said, give the Paisley adhesive plant an increased production capacity of one million pounds per month.

General Electric Company, Scenectady, N.Y. Construction is expected to begin this year on a $20,000,000 factory for the manufacture of steam turbines and electric generators at the General Electric Company's Schenectady works. It is estimated that construction and installation of new equipment will be completed by June 1949.

St. Clair Electric Products Co. is name of new company in Marysville, Mich., which will design and manufacture "Clariel" wire wound industrial heater and resistor components. H. W. Tuttle, who has resigned as president of H. W. Tuttle & Co., will be vice president and general manager in charge of sales and engineering.

Robins Conveyors, Inc. Philadelphia, Pa., office, formerly at 12 S. 12th St., will be consolidated with that of the parent organization, Hewitt-Robins, Inc., at 401 N. Broad St., Philadelphia 8, Pa.

United Chromium, Inc., Organic Div. New, modern lacquer plant has been opened in Carteret, N. J., replacing plant formerly operated in Waterbury, Conn. F. L. Scott, former manager of the Waterbury plant, will be in charge. Production capacity is four times that of Waterbury plant.

(*Please turn to page* 322)

don't give electrical wiring in your plant . . .

the brush off

If you do, it will cost you money!

Getting electricity to where you want it means more than just the stringing of wire and cable. First of all, it means selecting a distribution *system* that serves *your* plant with maximum efficiency . . . that meets today's requirements . . . that is easy and economical to revamp.

Our business is the development and manufacture of modern industrial and commercial distribution systems to meet your ever-changing needs. Installations are made by electrical contractors or electricians, but our engineers will be glad to consult with you regarding your wiring problems. You will find their long experience helpful.

Call our nearest sales office or write to NATIONAL ELECTRIC PRODUCTS CORPORATION, Pittsburgh 30, Pennsylvania.

NE WIRING SYSTEMS INCLUDE:
IPI BUS—*Industrial Plug-In Bus*
IFB BUS—*Industrial Feeder Bus*
NEPCODUCT—*Underfloor Wiring System*
SURFACEDUCT—*2 x 2 Surface Raceway*
WIREWA—*4 x 4 Hinged-Side Surface Raceway*
RUBBER SHEATHED CORD
VARNISHED CAMBRIC and POWER FEEDER CABLES
RIGID AND FLEXIBLE CONDUIT
ARMORED CABLE
PLUG-IN STRIP—*Wired Surface Raceway*

ALL ACCESSORIES AND FITTINGS FOR COMPLETE INSTALLATIONS

Everything in wiring points to NE

National Electric
PITTSBURGH, PA.

STROM BALLS For The Bearings Of Industry

Balls being ejected from normalizing furnaces during process of heat treating.

Industry continually seeks to perfect the performance of its products. That means that all parts must be brought up to higher and higher standards. It is especially important that the balls on which the bearings of industry run shall be of the highest standard of perfection. Strom Balls, in their unbelievably high qualities of finish, sphericity and precision—developed through exclusive concentration on making fine balls for 25 years—hold first place in American industry. Strom Steel Ball Co., 1850 So. 54th Ave., Cicero 50, Ill.

Strom BALLS Serve Industry

LARGEST INDEPENDENT AND EXCLUSIVE METAL BALL MANUFACTURER

● You pay a share of this tremendous loss, if you fail to protect iron and steel surfaces from the metal-consuming "fire" of rust. Yet, rust CAN be *stopped* by sealing the surface so that no oxygen can reach and oxidize it. RUST-OLEUM combats rust as effectively as water quenches fire.

For less than 1-cent per square foot you can add years of life to metal roofs, gutters, smokestacks, fire escapes, railings, and fences. RUST-OLEUM will positively stop and prevent rust on all types of metal surfaces.

See your distributor or write for catalog No. 246

EASY TO USE . . .
LASTING PROTECTION

- No expensive preparation. Merely wire brush to remove scale, dirt, etc.
- RUST-OLEUM penetrates remaining rust and incorporates it within the protective film.
- RUST-OLEUM does not crack, blister or peel.
- Excellent coverage . . . Lasts longer.
- Full selection of colors.

APPLY BY BRUSH, DIP OR SPRAY

RUST-OLEUM CORPORATION
2439 Oakton Street, Evanston, Illinois

American Well Works, Aurora, Ill., has purchased the Atlas Foundry, 2300 Bloomingdale Rd., Chicago. Plant will be operated as wholly owned division by present management.

American Cyanamid & Chemical Corp., subsidiary of American Cyanamid Co., New York City, has been consolidated with the parent company. It will be operated as Industrial Chemicals Divn. of American Cyanamid Co. Similar consolidation is planned for Lederle Laboratories, Inc., Pearl River, N. Y.

Roger Diesel and Aircraft Corporation, New York, has changed its name to R. B. Rogers Companies, Inc. The Rogers Group includes the Indian Motorcycle Co., and the Iseal Power Lawn Mower Co., Springfield, Mass.; Hill Diesel Engine Co. of Lansing, Mich.; Edwards Company of Sanford, N. C.; Fox Industries of Philidelphia; and Rogers International Corporation of New York, and others.

Seamans Supply Company is the name of new electrical wholesale company organized and headed by Robert W. Seamans, former assistant general sales manager of lighting products for Sylvania Electric Products, Inc. Offices will be at 606 Willows St., Manchester, N. H.

* * *

SYNTHETIC RUBBER INVENTORY INCREASED TO 45 DAYS

Rubber manufacturers no longer will be required to obtain permission to consume natural rubber, butyl and GR-S, the general purpose synthetic, and thus will be free to determine what permitted products they will make from the quantities of these materials they obtain, the Civilian Production Administration announces. Authority to "accept delivery" of rubber must still be obtained from CPA, however.

CPA emphasized that manufacturers still may produce only rubber products which are specifically permitted by the rubber order, R-1, and must still observe the specifications listed in the order.

Manufacturers will still be required to obtain authorization both to accept delivery and authorization to consume natural rubber latex, which remains in extremely short supply. In granting "authorization to consume" CPA has had the authority to require that specified quantities of various rubber materials be consumed in specified end-products. This channeling has been dispensed with except for natural rubber latex.

In addition, the use of natural rubber is now permitted in cup caps and inflations for milking machines.

Hereafter, the maximum inventory of any type of synthetic rubber, including synthetic latices, will be 45 days at the current production rate compared with the former maximum of 30 days. Among other minor changes the use of 30 per cent natural rubber will be permitted in the manufacture of building wire.

(*Please turn to page* 324)

STANDARDS and SPECIALS by the *Millions*

THE FERRY CAP & SET SCREW CO.

2165 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"
America's Best Looking Cap Screw

Made of high carbon steel—AISI C-1038—to standards for full finished hexagon head cap screws. Heads completely machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Carried in stock.

"HI-CARBS"
Heat Treated Black Satin Finish

Made of high carbon steel—AISI C-1038. Furnished with black satin finish due to heat treatment. Hexagon heads die-made, not machined. Point machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots—less burrs. Flat and chamfered machine point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots—less burrs. Flat and chamfered machine point. Carried in stock.

SET SCREWS

Square head and headless—cup and oval point—case hardened. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered point. Nut end, oval point. Carried in stock.

"SHINYTHREADS"
AIRCRAFT ENGINE STUDS

Made of highest aircraft quality alloy steel, finished to extremely close thread and body tolerance, with precision rolled threads—both straight and step types.

CONNECTING ROD BOLTS

Made of alloy steel—heat treated—threads rolled or cut—finished to extremely close thread and body tolerances—body ground where specified.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

VALVE TAPPET ADJUSTING SCREWS

Hexagon head style—to blueprint specifications—hexagon head hard; polished if specified—threads soft to close tolerance.

STANDARDS carried by LEADING DISTRIBUTORS

SPECIALS furnished to BLUE PRINT SPECIFICATIONS

TO SAVE TIME AND COST

Simply Specify **"SHINYHEADS"** NC or NF Thread | **"HI-CARBS"** NC or NF Thread

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

WRITE FOR INFORMATION • SEND FOR SAMPLES •

You even know "KEX"
WIPING TOWEL QUALITY
...in the dark!

THAT SMOOTH SOFTNESS . . . you can even tell in the dark . . . is the reason why you can use KEX Wiping Towels on the most delicate surfaces . . . without a worry. There isn't a hard seam . . . not a button . . . or a particle of hidden abrasive dirt . . . to scratch or mar the finest, most sensitive of precision instruments.

KEX Wiping Towels are uniform in size . . . big and tough enough for any wiping job . . . and usable right to the very edge. They are manufactured for the very purpose for which you will use them and are not cast-offs that have served other purposes. KEX Wiping Towels are always on hand when you need them . . . delivered on a regular schedule to fit your requirements. And *clean! They're absolutely clean* . . . made that way by a special, high heat process.

RENT KEX WIPING TOWELS AND SAVE MONEY!

Nothing to buy—no expensive inventory—just a low monthly rental. The very first month that you rent KEX Wiping Towels should show an appreciable saving on wiping costs.

For complete information, see classified section of your Telephone Directory for nearest KEX distributor, or write
KEX National Service, 295 Fifth Avenue,
New York 16, N. Y.

"KEX" NATIONAL SERVICE
REG. U.S. PAT. OFF.
"KEX"
REG. U. S. PAT. OFF.
NATIONAL SERVICE
A CALLAWAY MILLS PRODUCT
INDUSTRIAL WIPING CLOTHS

INVENTORY RESTRICTIONS ON LEAD STILL IN FORCE

Although the revocation of all controls on the use of lead became effective December 27, the Civilian Production Administration said that inventory restrictions still remain in effect and consumers' and producers' reporting forms must continue to be filed with CPA.

CPA inventory controls in Priorities Regulation 32 limit the amount of lead which any consumer may have in his possession to 30 days' requirements.

Reports which must continue to be filed are:

CPA-95—A monthly report of inventory, consumption and shipments of lead.

CPA-2919—Consumption and stocks of scrap and secondary lead and tin.

CPA-2920—Producers' report on production, stocks and shipments.

Department of Interior, Bureau of Mines Form 6-1112-M—Dealers' report on non-ferrous scrap metals.

In addition to revoking the lead order, M-38, CPA also lifted controls governing the use of lead in pigments and insecticides, through the revocation of L-354 (lead chemicals), and in ethyl fluid for the blending of high octane gasoline through the revocation of L-355 (ethyl fluid).

CPA also issued amendment 1 to Priorities Regulation 3, removing lead users from the list of those eligible for priorities assistance in obtaining the metal.

Coincidentally with the freeing of lead for all uses, the government lead stocks, currently estimated at around 37,000 tons, have been reserved for emergency release by CPA only. This action was accomplished by amending Priorities Regulation 34.

Government stocks held by the Office of Metals Reserve, Reconstruction Finance Corporation, amounted to more than 68,000 tons at the beginning of 1946 but have been drawn on steadily since then to meet the needs of industry, CPA said.

* * *

TINPLATE CONTROLS REMOVED

The Civilian Production Administration has removed all tinplate controls which previously had channelled the major portion of tinmill output into the production of cans for essential and perishable food.

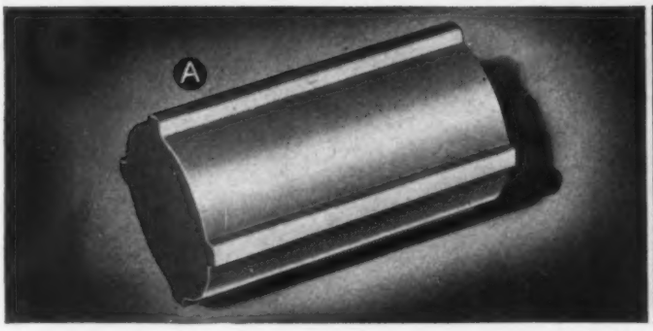
The action, accomplished by amending the tin container order (M-81), permits the use of cans for packing shortening, coffee, beer, pet foods and a number of other food products previously banned under the order. Non-food products for which tinplate is now permitted on an unlimited basis, as compared with a former quota basis, include turpentine, polishes, shellac, waxes, paints, liquid soap, roofing cement, etc.

Remaining unchanged in order M-81 are the restrictions which regulate the amount of tin coating to be used in tinplate for cans, and also the restrictions regulating the sizes of tin containers. These controls were retained, CPA said, because they offered the best methods of conserving pig, still in short supply.

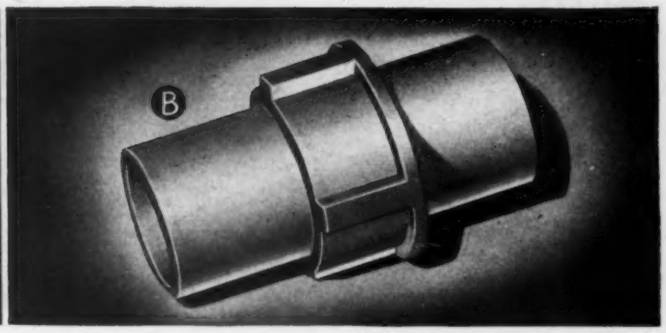
Scovill
NON-FERROUS
FORGINGS

What's the most economical way to make this aluminum part for a valve body?

When SCOVILL becomes your METAL-PARTner ... questions like this are easy to answer:



Originally made from this special shaped rod — 460 pounds per 1,000 pieces — the part required extensive and expensive machining operations. Compare Parts A and C.



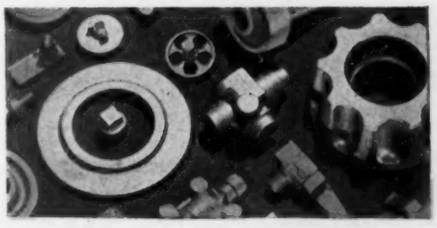
When the part was made as a Scovill Forging, only 220 lbs. of aluminum were needed per 1,000 pieces, and as you can see by comparing Parts B and A, plenty of machining time was eliminated.

RESULT: Scovill Forgings give the customer considerable savings.

SCOVILL
Masters of Metal

LOOK TO SCOVILL!

You, as do many of our satisfied customers, may find that your brass, aluminum or other non-ferrous parts can benefit greatly from a change in design or manufacturing method. Out of our backlog of non-ferrous forging experience and ability may come the *extra* that will give you the edge on competition. Let's explore how you may profit from making Scovill *your* METAL-PART*ner*. To start things moving, fill in the coupon and mail it today. Scovill Manufacturing Company, Waterbury 91, Conn. *Export Department:* 405 Lexington Avenue, New York 17, N. Y.



Please send me information about your metal-working facilities. I am interested in non-ferrous forgings for the applications checked:

- ☐ Aircraft
- ☐ Automobiles
- ☐ Band Instruments
- ☐ Blow Torches
- ☐ Cameras
- ☐ Communication Equipment
- ☐ Cylinder Valves
- ☐ Fire Extinguishers
- ☐ Household Appliances
- ☐ Industrial Instruments
- ☐ Plumbing Goods
- ☐ Pumps
- ☐ Valves
- ☐ Welding Equipment

Other applications.....

.....

SCOVILL MANUFACTURING COMPANY
Forgings Division
21 Mill Street
Waterbury 91, Connecticut

Name .....

Company .....

Address .....

Ed Rosain, Dodge-Chicago Industrial Equipment Co. (left) . . . L. J. Cashman, Dodge Manufacturing Corp. (right) . . . and C. E. Baker, Purchasing Agent, Tile-Tex Co., Chicago Heights, Ill.— discussing pillow block bearings and sheaves for "v"-belt drives.

"The P.A.'s Know What We're Talking About"

"The Purchasing Agents in our territory are thoroughly familiar with the overall operating conditions, problems, and requirements of their plants", writes Mr. Cashman. "This makes it simple for me to present our products and it saves a great deal of valuable time.

"These men appreciate quality and service because they know that these factors are vital to the continuous, profitable operation of their business for which they are in substantial measure responsible to management."

More and more Sales Managers are discovering that today the P.A. is the key to truly efficient sales work. He is a real power in today's buying. He is the man who makes the final decisions, even in the purchase of complex industrial equipment. Smart salesmen have long since stopped making "matter-of-form" calls on P.A.'s.

That's why every well-balanced advertising budget should include a schedule in "Purchasing"... the P.A.'s own magazine. It's the *one* magazine he *always* reads ... the place your sales message is sure to catch his eye, pave the way for your salesmen.

• • •

Examine this unique publication. For full information write PURCHASING, 205 East 42nd Street, New York 17, N. Y. Offices in Chicago, Cleveland, Los Angeles.

PURCHASING

ABC ABP

A CONOVER-MAST PUBLICATION

THE NATIONAL MAGAZINE FOR PURCHASING EXECUTIVES

We want to know how today's EVERYBODY

Many successful Sales Engineers like Mr. Cashman and Mr. Rosain know that no piece of equipment is too technical or complex to discuss intelligently with the modern Purchasing Executive

And we want *every one* of America's Sales Executives to recognize this truth. That's why month after month advertisements like the one on the left appear in magazines read by more than 40,000 men responsible for the sales and advertising of Industry's leading manufacturers.

The publishers of your magazine "Purchasing" will continue to conduct this campaign for a sound understanding of industrial distribution and procurement. This is a service not only to the purchasing group but to all industry.

Veeder-Root Dedicates Plant Addition

Practically Acre of Space Added to Headquarters Plant at Hartford

Products made by the Veeder-Root Company and its Customers were on display during "Open House" dedicating new addition.

A new three-story addition which adds practically an acre of floor space to the manufacturing and administrative headquarters of Veeder-Root Incorporated at Hartford, Conn., was formally opened at a four-day "Open House" for employees, customers and the general public in December. The new addition brings the total area of the company's plants at Hartford and Bristol to 295,000 square feet.

It is estimated that the company was host to more than 5000 persons during the four-day "open house". The entire second floor of the new building was given over to an exhibit of the company's products and components, and of especial interest to the visitors were some 70 different products made by customers in which Veeder-Root counting and computing devices and other V-R products are used. Though representative of but a small part of the applications, these exhibits included such important end products as gasoline computer pumps, fuel oil meter registers, milling machine cutter heads, textile machinery, postage metering equipment, printing presses, parking meters, deep-freeze units, railway speed indicators, voting machines, check writing machines, and juke boxes.

Also on exhibit were old cyclometers, some gold-plated, originated by the Veeder Manufacturing Company of Hartford which was established in 1895. This company was merged with the Root Company in 1928. The Root Company was established in Bristol, Conn. in 1866. The Bristol plant now has a working force of 400, and approximately 1600 people are employed in the Hartford operation, producing all types of counting devices.

The primary purpose of the exhibit was to demonstrate to the corporation's family of 2000 employees, the importance of their individual jobs, and the types of end products in which their handiwork is used.

During the time the exhibit was open, the company's cafeteria served coffee and doughnuts to the guests.

DATA BOOK ON ALUMINUM ALLOYS AND MILL PRODUCTS

The Reynolds Metals Company, Dept. 47, 2500 So. Third St., Louisville, Ky., announces publication of 248-page book featuring 106 tables of technical data on aluminum alloys. The book discusses alloy tempers, physical properties and presents detailed data on chemical, physical and mechanical properties of high purity aluminum; with nominal chemical composition, typical mechanical properties, values of density of coefficients of expansion, thermal and electrical conductivity, annealing and heat-treating cycles for wrought, sand-casting, permanent-mold casting, and die-casting alloys. Subsequent chapters cover various mill products, manufacturing methods, alloys and tempers, identification, packing, ordering data, commercial and standard sizes, commercial size and thickness tolerances, weights, weight conversion data, pressure calculations for tubing and pipe, and other similar data. Section on related specifications is arranged according to alloy designations, these being broken down into the various product forms; related specifications are listed, including Federal, Army and Army Air Forces, Navy, Army-Navy (AN) Aeronautical, SAE Handbook, AMS and ASTM specifications.

The price of the book is $2.00. Size 6" x 9", wirebound to open flat.

FREE BOOKLET ON CUTTING TOOL MATERIALS

Publication of informative booklet entitled "Cutting Tool Materials", 32 pages, analyzing impartially the comparative fields of usefulness of high speed steel, cast alloys, and carbides as cutting tools, is announced by the Allegheny Ludlum Steel Corporation, 2020 Oliver Building, Pittsburgh, Pa.

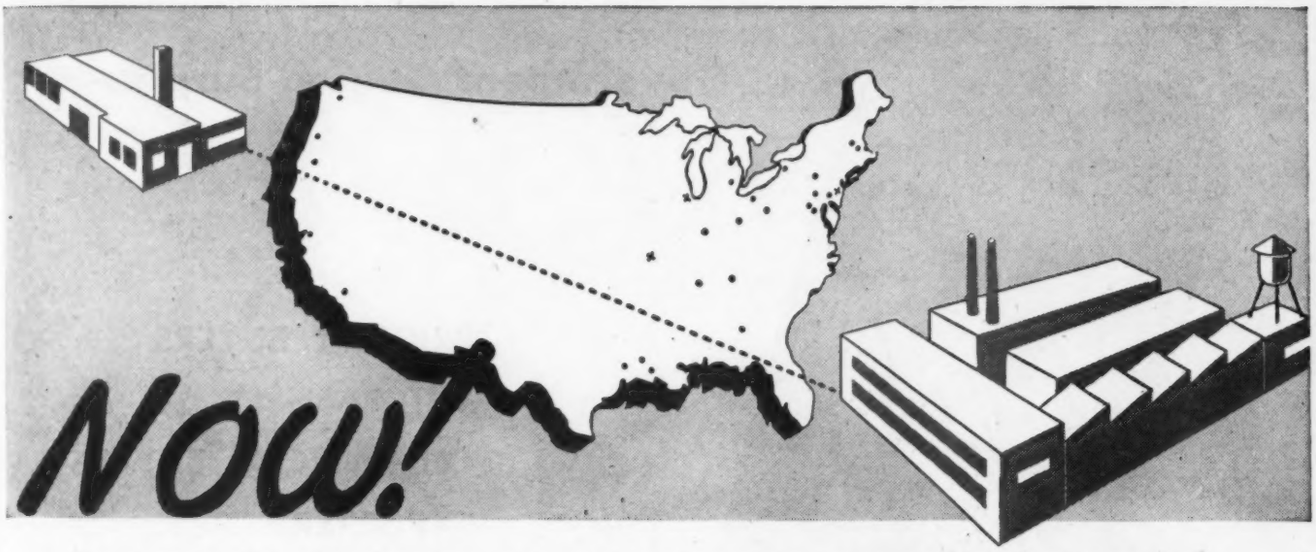
The brochure is believed to be the first in which a producer has attempted to compare the properties and uses of these three groups of cutting materials. The objective of the booklet, is to correlate comprehensively the basic characteristics, properties and functions of the three broad types of cutting materials, so their usefulness for specific requirements can be evaluated. "There can be no hard and fast rule in the selection of the proper cutting material; we can only point out the governing factors and make recommendations", the booklet explains. Copy may be obtained without cost upon request.

GEARED PIPE THREADER

A quick-setting workholder and new balanced loop handles are two innovations on 4P geared pipe threader announced by the Ridge Tool Co., Elyria, Ohio. The quick-setting workholder enables a worker to set the threader exactly to size before being placed on the pipe, and once on the pipe but one screw needs tightening to hold it securely. Bushings have been eliminated. The balanced loop handles on the enclosed gear case prevent slipping or tipping over, making it easy to pick up and put straight on the pipe, and easy to carry with one hand. Economy of operation is promoted by twin-anchored drive shaft that turns in oilless bronze bearings. The threader is provided with four sets of five high-speed steel dies for cutting clean, accurate threads, standard or tapered, drip threads and short nipples. Ratched handle is provided, and a special Rigid design universal drive shaft is available for power drive.

TOOLMAKING PRACTICES NEW BOOK ON HOLE LOCATION

"Precision Hole Location for Interchangeability in Toolmaking and Production" is the title of new 448-book just announced by the Moore Special Tool Company of Bridgeport, Conn., manufacturers of jig borers and jig grinders. The book is illustrated with over 400 photographs and working drawings, including 184 pages of Woodworth tables for converting holes from 3 to 100 on circles to rectangular coordinates. The book is styled a comprehensive review of all hole location practices and their evolution to the point where the toolmaker can now employ engineered methods and apply the principle of interchangeability to his own operations. The Moore Company calls it "the first authoritative and complete textbook ever published on this vital phase of toolmaking. Price to members of metalworking industry in U.S. is $3.00; elsewhere, $3.50.



FOR FAST SERVICE ON STAINLESS TUBING ORDERS . . .

Call Your Carpenter Distributor!

- **ALBANY, NEW YORK**
  Anti-Corrosive Metal Products Co., Inc.—Castleton 2511
- **ATLANTA, GEORGIA**
  J. M. Tull Metal & Supply Co.—Walnut 3525
- **BALTIMORE, MARYLAND**
  Horace T. Potts Co.—Mulberry 8260
- **BEAUMONT, TEXAS**
  Standard Brass & Mfg. Co.—Beaumont 1129
- **BERKELEY, CALIFORNIA**
  American Rolling Mill Co. of Calif.—Ashberry 5600
- **BUFFALO, NEW YORK**
  Service Steel Company—Delaware 8900
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  Cherry-Burrell Corp.—Dearborn 7900 (Sanitary Tubing)
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  Branch Office of The Carpenter Steel Company Welded Alloy Tube Division—Central 3506
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  Service Steel Co.—Wabash 2750
- **CLEVELAND, OHIO**
  Cleveland Tool & Supply Co.—Cherry 2510
- **DETROIT, MICHIGAN**
  Service Steel Company—Randolph 9350
- **ELIZABETH, NEW JERSEY**
  Schnitzer Alloy Products Co.—Eliz. 2-2090
- **EUGENE, OREGON**
  Electric Steel Foundry Co.—5012
- **HOUSTON, TEXAS**
  Standard Brass & Mfg. Co.—Preston 1123
  A. P. Wright—Fairfax 0268
- **INDIANAPOLIS, INDIANA**
  C. A. Roberts Co.—Market 8455
- x **KENILWORTH, NEW JERSEY**
  The Carpenter Steel Company Welded Alloy Tube Division—Elizabeth 3-2100
- **KINGSPORT, TENNESSEE**
  Slip-Not Belting Co.—Kingsport 5128
- **KNOXVILLE, TENNESSEE**
  Slip-Not Belting Co.—Knoxville 3-3811
- **LOS ANGELES, CALIFORNIA**
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  Electric Steel Foundry Co.—Lucas 7251
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- **PHILADELPHIA, PENNA.**
  Horace T. Potts Co.—Nebraska 4-8870
- **PITTSBURGH, PENNA.**
  Chandler-Boyd Co.—Hemlock 1860
- **PORT ARTHUR, TEXAS**
  Standard Brass & Mfg. Co.—Port Arthur 9377
- **PORTLAND, OREGON**
  Electric Steel Foundry Co.—Atwater 2141
- x **ST. LOUIS, MISSOURI**
  C. A. Roberts Co.—Chestnut 7070
  Branch Office of The Carpenter Steel Company Welded Alloy Tube Division—Franklin 0905
- **SAN FRANCISCO, CALIF.**
  Electric Steel Foundry Co.—Douglas 8346
- **SEATTLE, WASHINGTON**
  Electric Steel Foundry Co.—Elliott 4161

CARPENTER STAINLESS TUBING for
—Strength and Rigidity
—Weight Savings
—Corrosion Resistance
—Heat Resistance
—Accuracy
—Fabricating Savings
—Longer Service Life
—Sales Appeal

THE CARPENTER STEEL COMPANY • Welded Alloy Tube Division • Kenilworth, N. J.

Carpenter
WELDED
STAINLESS TUBING

Government Owned Surplus

PRIORITY BUYERS
VETERANS
COMMERCIAL BUYERS
EXPORTERS

Prices and description of tires illustrated shown on facing page. Other types available listed below.

SEND ORDERS TO
WAR ASSETS ADMINISTRATION
TIRE AND TUBE SECTION,
704 RACE STREET, CINCINNATI, OHIO

SIZE	DESCRIPTION	WEIGHT	QUANTITY	PRICE (Each)
8½ x 4 x 4	Flat Base Industrial type, smooth	10 lbs.	2500	$2.46
20 x 4 x 16	Flat Base Industrial type, smooth	32 lbs.	17	3.85
20 x 4 x 16	Flat Base Industrial type, non-skid	33 lbs.	311	3.85
15 x 5 x 11¼	Flat Base Industrial type, smooth	34 lbs.	4360	3.80
20 x 5 x 16	Flat Base Industrial type, smooth	42 lbs.	326	4.55
20 x 5 x 16	Flat Base Industrial type, non-skid	41 lbs.	2183	4.55
21 x 5 x 15	Flat Base Industrial type, smooth	50 lbs.	2	5.70
21 x 5 x 15	Flat Base Industrial type, non-skid	49 lbs.	2785	5.70
24 x 5 x 18	Flat Base Industrial type, non-skid	62 lbs.	1067	7.79
20 x 6 x 16	Flat Base Industrial type, smooth	51 lbs.	425	4.92
20 x 6 x 16	Flat Base Industrial type, non-skid	50 lbs.	1170	4.92
22 x 6 x 17¾	Flat Base Industrial type, smooth	52 lbs.	1008	5.20
15 x 7 x 11¼	Flat Base Industrial type, smooth	42 lbs.	1471	4.80
32 x 3 x 26	Channel Base Industrial Type, smooth	56 lbs.	337	5.50

All fixed prices F.O.B. Columbus, Ohio

Save Money *on* Solid Tires

for industrial trucks and tractors

● All tires pressed-on type ● Weights to the nearest pound ● One low fixed price to all classes of buyers ● All unused ● Minimum and maximum quantities will be determined by the size and number of orders received, to permit equitable distribution.

	❶	❷	❸	❹	❺	❻
SIZE	40 x 10 x 34	40 x 10 x 34	22 x 8 x 17¾	22 x 8 x 17¾	21 x 5 x 15	22 x 8 x 17¾
DESCRIPTION	Heavy Duty Cushion type, non-skid	Tractor, non-skid	Flat Base Industrial type, smooth. Includes some single-grooved	Flat Base Industrial type, smooth. Includes some single-grooved	Semi-pneumatic cushion type, non-skid	Flat Base Industrial type, non-skid
WEIGHT	345 lbs.	219 lbs.	76 lbs.	76 lbs.	37 lbs.	78 & 86 lbs.
QUANTITY	99	170	4865	4865	479	839
PRICE (Each)	$31.65	$21.10	$8.07	$8.07	$5.70	$8.07

All fixed prices F. O. B. Columbus, Ohio

This is a concurrent and continuous sale. Ten percent of the total inventory will be reserved to fill orders received from Federal Agencies by 5 p. m. on February 24, 1947. All other orders received by 5 p.m. on this date will be filled in the following sequence: (1) Certified Veterans of World War II; (2) Subsequent priority claimants; (3) Non-priority purchasers.

ALL ORDERS received after this date will be filled without regard to priorities.

PAYMENTS must be made when requested, unless credit has been established in advance at WAA regional offices. Business checks or approved personal checks will be accepted.

PURCHASER'S ORDER must state thereon: "This order is subject to War Assets Administration standard conditions of sale and all other advertised terms and conditions and no other terms or conditions shall be binding on War Assets Administration."

EXPORTERS: Your business is solicited. Any inquiries regarding export *control* should be referred to Office of International Trade, Department of Commerce, Washington 25, D. C.

WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

919

ARE YOU

STUCK FOR PARTS?

ARE YOU undersupplied on some, and oversupplied on others... with the resulting heavy inventory? Sales low? Unit cost rising? Worker efficiency low because of lack of parts to assemble your product?

ARE YOUR parts suppliers unable or unwilling to make short runs of a few hundred or a few thousand pieces?

YOU DON'T NEED TO BE STYMIED by lack of castings, forgings and particular shapes and materials. Why not try a new proven source?

MASTERS' engineers, methods, machines and men are versatile to the Nth degree. Thousands of top quality items have been produced by us for hundreds of leading manufacturers.

Fluid conductor fittings catalog sent on request.

IRVIN W. MASTERS, Inc.

3039 ANDRITA ST., LOS ANGELES 41, CALIF.

LET US FIGURE ON YOUR REQUIREMENTS FOR DURAL, BRASS, STEEL OR STAINLESS STEEL PARTS

More Value For Your Tax Dollar

(*Continued from page* 131)

fund I might designate—if I would buy his branded hose. We have purchased specification hose for 28 years, and have had the best service one could possibly expect. Each length is rigidly tested under pressure before acceptance. We have compared it with high priced branded hose and have found no difference in quality.

Consider the purchase of fire apparatus. Each salesman would like to convince you that by paying more you will obtain equipment which will prove more serviceable than that purchased on a specification and competitive bids. Our experience over a period of years has demonstrated that we can save from one to two thousand dollars on each piece of fire apparatus by making these purchases on a specification and on fully advertised bids. Tests of equipment purchased in this way made by an impartial testing organization, the Fire Insurance Rating Bureau, stated on the last test of a pumping engine recently delivered: "Contract requirements delivered easily and performance satisfactory throughout." On two pumping engines and a ladder truck, a total saving of $3,854 on the three vehicles was shown.

All library books are purchased on competitive bids and an annual contract. The first year when this work was taken over by the purchasing department, a saving of $2,400 was made.

Thousands of dollars are saved annually by deducting excise taxes and supplying vendors with signed tax exemption certificates. These taxes run as high as 25% on photographic material and cameras. Persons traveling on official city business are exempt from the 15% transportation tax. The city pays no transportation tax on merchandise shipped directly to it. A 1¢ per ton Federal tax on coal was assessed January 1, 1940; it was repealed April 25, 1943. The city is exempt, and exemptions are retroactive to January 1, 1940. In this period, 200,000 tons of coal were delivered; we obtained a refund of $2,000. In 1944, cash refunds from various coal dealers, for excise taxes inadvertently included in their bids, amounted to $958.78. These were deducted before bills were paid. These matters are closely watched by the city purchasing department.

The disposal of scrap and obso-

(*Continued on page* 334)

Greater Strength and Uniformity in Cap Screws—
CLEVELAND Cap Screws—
made by the
KAUFMAN DOUBLE EXTRUSION PROCESS

● Cleveland dependability in threaded fasteners brings you two-fold economy—assurance against breakage, and fast easy handling in assembly. Cleveland Cap Screws are made by the Kaufman Process—the modern cold-forging method that assures you *stronger* fasteners than any other known process. And you can depend on their accurate-to-size heads, shanks and strong smooth-running threads. Cleveland High Carbon Heat Treated Cap Screws are the toughest fasteners in this class. Write the factory or ask your jobber.

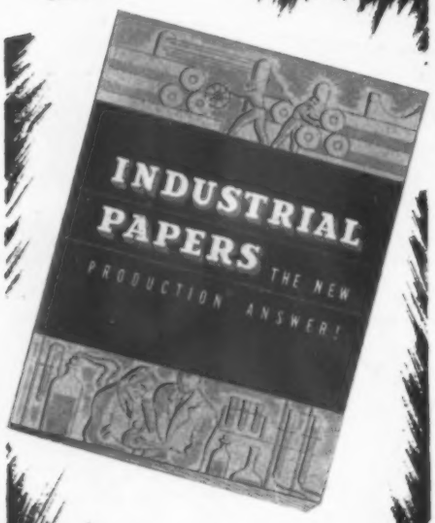
CLEVELAND *Top Quality* FASTENERS

The Cleveland Cap Screw Company

2917 EAST 79TH STREET • CLEVELAND 4, OHIO

Ask your jobber for Cleveland Fasteners

Idea Booklet



FOR ALERT INDUSTRIALISTS.

Ideas from 46 years of engineering technical papers. Papers that are adaptable, versatile, economical. Apply this "know-how" to your process or product. Send for your copy today. Tell us your problems.

REG. U. S. CUSTOM BUILT AND CENTRALINE SPECIALTY PAPERS PAT. OFF.

CENTRAL PAPER COMPANY
INCORPORATED
2446 LAKESHORE DRIVE, MUSKEGON, MICH.
BRANCHES IN LEADING CITIES

More Value For Your Tax Dollar

(*Continued from page* 332)

lete materials was placed under the jurisdiction of the purchasing department by city ordinance in order that it might be properly classified and sold at the highest prices. Before Milwaukee's scrap was handled by the purchasing department, much of it "took legs and walked away." Sales of scrap in 1942, including car rails removed from streets, amounted to $88,000. The income from this source has been less in recent years due to lack of purchases of new equipment to replace that now obsolete, and also to lack of street and building improvements, all because of wartime restrictions and shortages.

The purchasing department of Milwaukee also handles the transfer of materials and equipment which may become obsolete or surplus in one department, but can be used in another department. If any materials can no longer be used by any department, the purchasing department disposes of them by taking competitive bids, making sure that the materials are paid for in cash in advance, and being sure that the Supervisor of Salvage is present when the materials are removed.

By preparing a drawing and specification, and requesting competitive bids, we reduced the price of 100 spindle pins for trailers from $7.50 net each, to $2.25 less 1% for cash, or a net saving of $526.26 on this single transaction alone.

Cleaning powder was standardized. During normal times it is purchased in 100 pound kegs at $3.39 per cwt. less 1% for cash, whereas former prices were as high as $17 per cwt. on branded types.

Bids are taken annually for the complete overhauling of typewriters and other office machines. On the typewriters, a recent award was made at $17.50, while the high bid was $24.50 per machine. This price includes a year's guarantee.

The cost of burglary, safe robbery, and messenger insurance for the City Treasurer's office was originally $1,200 for one year. Competitive bids reduced this cost to $269.38. Bids were then taken on a three year basis, with a further saving of 12½%.

Insurance for the three elevators in city hospitals originally cost $120 per year, or $360 for three years. Competitive bids were obtained on a three year basis, reducing the total to $124.67, or a reduction of ap-

(*Continued on page* 336)

BRIGHTER FLOORS with DOLCOWAX

Compare distinctive milky-white DOLCOWAX with the usual dark gray floor wax emulsion. That sparkling whiteness is preserved from laboratory test tube to your floor—the result of precise blending of the finest ingredients obtainable, including the *top grades* of carnauba wax. For the same reason DOLCOWAX has no oily float or sediment — *every* bit is usable — unlike inferior products of which a large proportion must be discarded. DOLCOWAX spreads and levels well . . . forms a hard, clear coating on all standard types of flooring which grows brighter as it is polished by traffic. And it *stays on* to give extra-long, dirt-resisting service.

DOLCOWAX, used regularly, preserves floorings . . . lengthens the life of expensive linoleum, cork, rubber and mastic.

DOLCOWAX spreads with *one stroke*—neither rubbing nor polishing is required. Under favorable atmospheric conditions your floor will be ready for use 20 minutes after application.

DOLCOWAX requires a minimum of maintenance. Daily routine cleaning and dry buffing is sufficient.

Write for complete illustrated booklet, "Floor Maintenance."

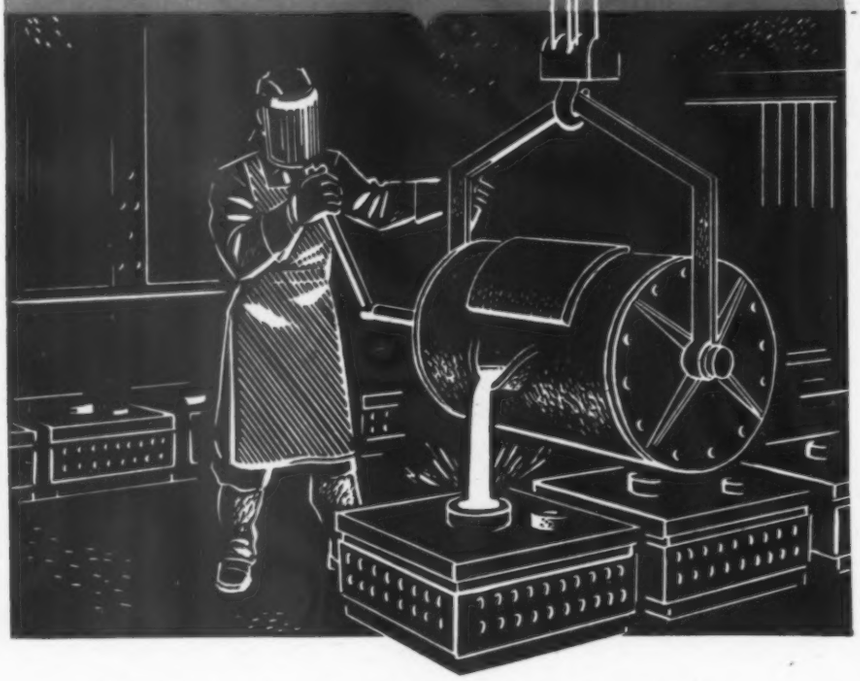
The C. B. DOLGE CO.
Westport, Connecticut

DOLCOWAX

Sleeve Bearings are free from complication. Requiring no shaft shoulders, no threaded shaft, no locknuts, they present the ultimate in straightforward trouble-free design. The Bunting Cast Bronze Sleeve Bearing is the popular leader in its field. Consult the Bunting Engineers. The Bunting Brass & Bronze Company, Toledo 9, Ohio. Branches in principal cities.
BRONZE BEARINGS
BUSHINGS
PRECISION BRONZE BARS
Bunting
58

PRODUCTION CASTINGS THAT MEET *Every* SPECIFICATION *Every* TIME...

Always call SUPERIOR



SUPERIOR PRODUCTION CASTINGS

GRAY IRON • ALLOY IRON • ELECTRIC FURNACE IRON

OFFER ALL THESE ADVANTAGES

- METALLURGICAL CONTROL
  Superior's step-by-step control of the melt, assures highest quality of the finished product.
- MACHINABILITY
  Superior castings may be milled, drilled, turned and otherwise machined easily and economically.
- ACCURACY TO SPECIFICATIONS
  Superior experience and "know-how" assure castings which meet the requirements of the most exacting specifications.
- UNIFORMITY
  Superior castings offer consistent uniformity of grain structure and cross section density.
- CLEAN SURFACE
  Superior castings have clean, smooth surface.

SUPERIOR FOUNDRY, INC.
3542 EAST 71st STREET
CLEVELAND 5, OHIO

MIchigan 3078

More Value For Your Tax Dollar

(*Continued from page* 334)

proximately two-thirds of the former cost.

I could continue on with many more illustrations, but I believe that these will suffice as indicating the various ways in which a public purchasing agent can save your tax dollars.

If citizens in general would attend more public meetings, where city officials discuss their local problems, they would realize the intricate nature of public administration, and would be more cooperative toward those who are doing their level best to give the greatest measure of public service for the least cost. People should fully comprehend that citizenship is a privilege that requires more of them than merely their tax money; that it also implies a contribution of time and thought on their part toward assisting and otherwise supporting the honest and forthright efforts of public officials in the performance of their duities, regardless of any political, religious or other differences. When we all put our shoulders to the wheel, we can accomplish our common objective of efficient municipal government.

Outside Reading For The Buyer

(*Continued from page* 140)

and "efficient" becomes clear as sunlight when Barnard fits such words into their proper place in defining the functions of an executive. The book claims no pretensions to semantics, but the author does not permit any possible misinterpretation of words in his specifications for a real executive. He gets home some robust cuts at catchwords and shibboleths—individualism, laissez-faire, statism, liberty, freedom, regimentation, etc. — and he relegates the indiscriminate use of all of them to the outer darkness in his inquiry.

The book does not pretend to set out a packaged formula for a step-by-step instruction in the acquisition of executive ability. He defines, explains, establishes and gives reasons for a desirable and attainable objective for any executive, or for any person who would be one.

Like an experienced specification writer, he tells what is to be achieved, the tests that will be demanded and the minimum results expected, in order to qualify as a successful bidder in the competition

(*Continued on page* 338)

RADIO
Builders and Listeners
...Both Give Top Rating

to these Cost-Controlling,

Good-Looking AMERICAN PHILLIPS SCREWS

1. TOP RATING in Production Savings: Fast, fumble-proof, automatically straight-driving . . . American Phillips Screws make possible high-volume radio production where even the slightest surface-scratch means "reject." For at highest speeds, the 4-winged American Phillips Driver can't twist out to scar work-surfaces! *Speed . . . with complete safety both for work and workers* . . . that's the double advantage that makes American Phillips Screws the *lowest-cost fastening method on any job.* Whatever product *you* assemble, you will find that American Phillips Screws pay off with SAVINGS UP TO 50%.

2. TOP RATING in Sales Promotion: The decorative heads of American Phillips Screws are a customer-accepted mark of quality. And they're an added assurance of serviceability under incessant use. So standardize on American Phillips Screws throughout your assembly departments. Write:

AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND
Chicago 11: 589 E. Illinois St. *Detroit 2:* 502 Stephenson Building

4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS

AMERICAN PHILLIPS *Screws*

ALL TYPES
ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

Protective
GARMENTS
for
ALL TRADES

The apron is style No. K76 — Heavy, oiled duck with 8" bench high front patch, size 36x48.

The above garments are waterproofed with double-stitched seams and ruggedly constructed for extra wear.

No need for you to look further for waterproofed protective garments . . . Sawyer's has one for every trade. Rainwear that bears the "LIGHTHOUSE" label will assure you that you're buying a garment made from the finest rubberized material available. And if your specifications call for an oiled fabric, our "FROG Brand" has been a leader in the oilskin field for over 100 years. Whichever you buy, the trade-mark guarantees you a garment that has expert workmanship, full measure and top quality.

Write for descriptive folder of our complete rubberized and oilskin line.

THE H. M. SAWYER & SON CO.
28 Thorndike St. East Cambridge 41, Mass.

ARMSTRONG
CUTTER SERVICE

Whatever the cutting speed you need, no matter what the material to be machined, the ARMSTRONG System of Tool Holders provides correctly designed ARMSTRONG TOOL HOLDERS and cutters of proper type for the job.

For ordinary machining at the speeds indicated, we recommend:

up to 150 F.P.M.

ARMSTRONG HIGH - SPEED Bits, Blades or Cutters in standard ARMSTRONG TOOL HOLDERS.

up to 300 F.P.M.

ARMALLOY (cast alloy) Bits and Blades in ARMSTRONG CA TOOL HOLDERS.

up to 600 F.P.M.

ARMIDE (Carbide-Tipped) Cutters in ARMSTRONG Carbide TOOL HOLDERS.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People" 303 N. Francisco Ave., Chicago, U.S.A.
Eastern Warehouse & Sales: 199 Lafayette St., New York

Outside Reading For The Buyer

(*Continued from page 338*)

for executive responsibility.

In the hands of studious executives and administrators, and those who have ambition to be either, innumerable passages in this book will be enthusiastically underscored as examples of clear thinking.

In a book called "The Social Problems of an Industrial Civilization", by Prof. Elton Mayo, the author has presented mature reflections based on over twenty years experience in clinical study of concrete industrial and managerial situations. It is addressed to business administrators and executives who, because of their position and responsibility, not only can profit from more effective cooperation in their own management, but by supplementing their technical skill with an understanding of human-social facts can make a positive contribution to the development of social skills outside their particular organization.

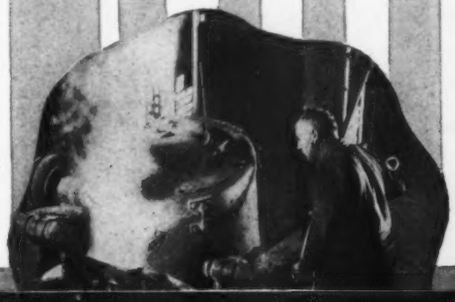
At the outset, Prof. Mayo clarifies the hitherto unrealized difference between two principles of social organization—the difference between an *established* society and an *adaptive* one. The burden of his thesis is the necessity for more effective cooperation, communication and collaboration between management and employees—in short, effective teamwork.

The answers to a great many problems significant for executives in the coming decade are recorded in this book. These conclusions are in no sense theoretical, nor based on hypothetical cases. They are factual and scientific and were arrived at by actual clinical study, not in detached laboratory fashion, but in shop, assembly room and office.

The results of the Hawthorne and Western Electric Company clinical studies of management-employee relationships are alone an advanced education for executives in any business. The author has gone to some pains in distinguishing the difference between "knowledge - of - acquaintance" and "knowledge - about". Throughout his book he religiously sticks to the "knowledge - of - acquaintance" method of study — the severe clinical way of investigation. There is a disarming modesty about the presentation and findings of the case-history studies. There is little room for conjecture when sixteen years of clinical study of over twen-

(*Continued on page 340*)

SEYMOUR



NICKEL SILVER

THE IDEAL BASE FOR PLATED WARE

The base, or "body," of much of the silver, nickel and chromium plated ware made in this country is Seymour Nickel Silver — an alloy of copper, nickel and zinc. Tarnish-resistant, silvery-white in color — when it is eventually exposed by wear, there is no unsightly contrast. It is capable of any degree of ductility, which makes it the perfect alloy for spinning, drawing and stamping. When leaded, it has excellent workability.

If your plant is not satisfied with the alloy now being used, suggest that they change over to Seymour Nickel Silver.

THE SEYMOUR MANUFACTURING CO., SEYMOUR, CONN.

NONFERROUS ALLOYS SINCE 1878

OUT OUR WAY

THAT'S TH' BIGGEST STRAIN OF BEIN' TH' HEAD OF ANYTHING! TH' ONES WHO CAN'T GET ALONG WITHOUT YOU ARE TOO QUICK WITH TH' PULMOTOR, AN' TH' ONES THAT CAN'T GET ALONG WITH YOU ARE TOO QUICK WITH TH' STRETCHER!
YEH--BUT IT WAS A TERRIBLE SHOCK! THEY JUST TOLD HIM THAT WE'RE OUTA SOL-SPEEDI-DRI AND THEY FERGOT TO ORDER SOME!
T. M. REG. U. S. PAT. OFF. COPR. 1946 BY NEA SERVICE, INC.
A CRYING SHAME
J.R.WILLIAMS

A crying matter? Sure . . . for when floors become oil- and grease-soaked . . . when their surfaces become ice-slick and dangerous . . . it's *time* to cry for SOL-SPEEDI-DRI, the oil-thirsty absorbent!

SOL-SPEEDI-DRI is a white, granular substance that soaks-up oil- and grease-deposits as a sponge soaks-up water. Just spread it around . . . and immediately, you've got a magic carpet of safety underfoot . . . no slipping or falling with SOL-SPEEDI-DRI on the job. Sweep it up with an ordinary, stiff broom . . . and your floors are bright and safe.

SOL-SPEEDI-DRI puts economy in any industrial plant on a firm foundation. Accident rates go down . . . productive time goes up . . . manpower is saved for other jobs. It works while you work . . . in safety!

SUPPLIERS:

East—Safety & Maintenance Co., Inc., No. 1 Wall St., New York 5, N. Y.
South, Midwest & West Coast—Waverly Petroleum Products Co., Drexel Bldg., Philadelphia 6, Pa.

SOL·SPEEDI·DRI
OIL AND GREASE ABSORBENT
UL
Get the full story of SOL-SPEEDI-DRI today. Just write "SOL-SPEEDI-DRI" on your letterhead or business card for complete details and a free, generous sample.

Outside Reading For The Buyer

(*Continued from page* 338)

ty thousand individuals form the basis of a report on a specific problem, collaborated in by several impartial scientists. Yet the author does not suggest that his book provides the best answers. I think it does!

I enthusiastically recommend the chapter entitled "The Rabble Hypothesis" to every aspirant for any position of control of whatever degree. Condensed in this chapter there is an education in human relationship, together with an historical perspective that will clear up much of the foggy thinking circulated by pseudo-economists.

The specific problems attacked by Prof. Mayo and his distinguished colleagues, are common to every executive. The conclusions arrived at, resulting from the clinical method he advocates are unassailable. Interesting and instructive as they are, however, the greatest value to be drived from careful reading of this book, is the possible application of his method in the solution of any problem facing executives. It suggests a methodology for meeting situations with a disciplined mind capable of penetrating to the core of a question. It will require a new type of executive, or a re-education of the old type, to maximize the experience reported by Mayo and his colleagues. "The Social Problems of an Industrial Civilization" points a warning finger to what is ahead of us, and how it can be met.

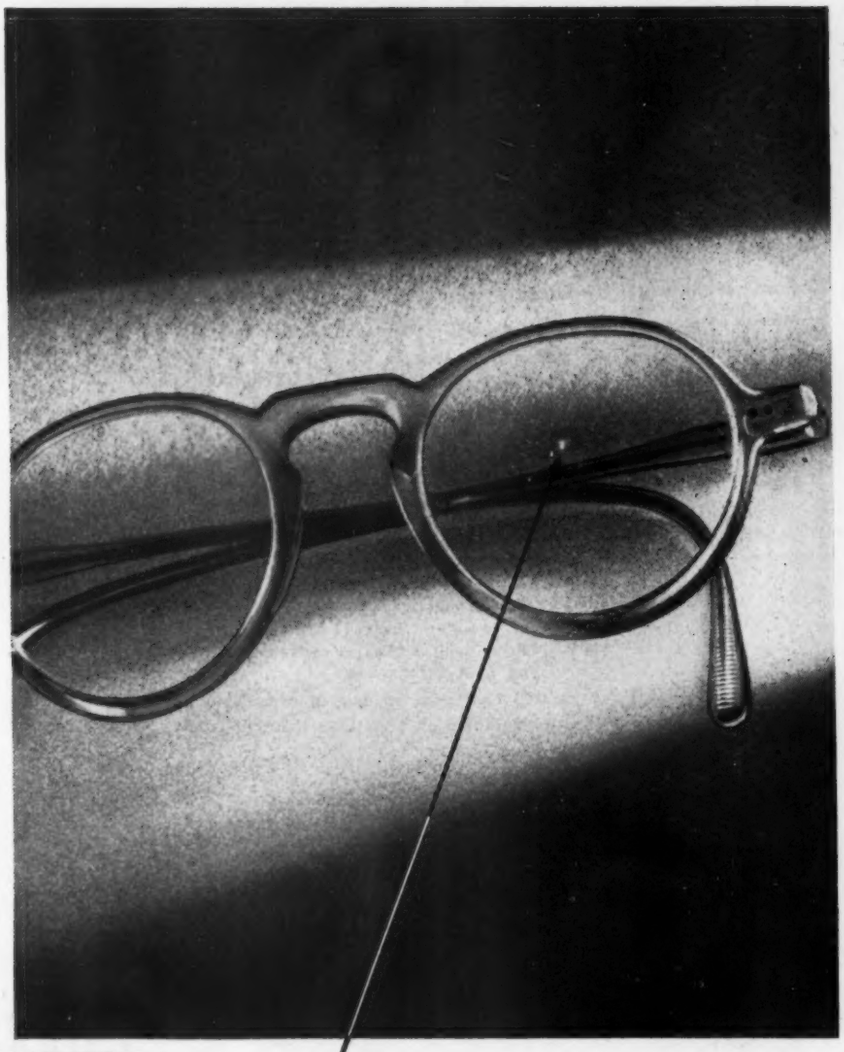
The message this book delivers is two-fold: first, to enlarge modern industry's sense of social responsibility; second, to indicate the degree of enlightened self - interest that urges it to train executives *for its new tasks.*

The common characteristics of the three books mentioned are clarity, sincerity, authority and readability. All of them seem to convince the reader that they are concerned with facts and not inferences from questionable assumptions. All of them emphatically assert that executives—old and new—will have to adjust their thinking to the new tempo of the Industrial Age. The direction they offer is authoritative and trustworthy. The next step is ours.

One of the most persistent themes of these books seems to be that American Industry has in its arsenal a prodigious store of the human and material resources, the technical

(*Continued on page* 342)

Safety Goggles Win High Praise from Gem Safety Razor Corporation



"This A-O Goggle saved the eye and possibly the life of E. Steller of the Brush Department. This chip in the lens was caused by the tool-bit he holds in his hand."

Typical records reveal that eye injuries cost (in first aid attention, idle machine charges, unproductive time and other frequently "hidden costs") $14.60 per injured man per year. Yet 98% of these accidents (according to the verified figures of the National Society for the Prevention of Blindness) are *avoidable*—mainly through the use of Safety Goggles.

Can you afford to overlook this opportunity to lower your production costs?

Send to your nearest A-O Safety Representative or direct to American Optical Company, Box H for a copy of the new book, "Eye Accident Costs," telling how to prevent them and how much you can save by preventing them.

American Optical COMPANY
Safety Division

SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL CITIES

A few of the bends in all types of metals that have been designed and made by Swan.
We concentrate on the thing we know best how to do. Among the specific applications of Swan services are —
All types of bends and coils
Exhaust, oil and hydraulic line assemblies
Inserts for die castings
Intake manifolds
Carburetors
Oil Lines
Frame Assemblies
Flash welding, testing and bending of long tubes for condensers and heat exchangers.
It will cost you nothing to consult our engineers on your tube bending problem.

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Just Off The Press

Your fleet superintendent can use this new 64-page textbook on fleet cleaning. It suggests money and time-saving methods and equipment for:

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. . . and other cleaning problems of truck and bus maintenance. Ask for as many copies as you need for interested personnel in your organization.

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Service Representatives in Principal Cities
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Outside Reading For The Buyer

(*Continued from page* 340)

knowledge, the hard-won experience —all the equipment for the most advanced, efficient and successful economic, social and political system ever known to mankind. But unless it trains executives to fully utilize these assets they will be as useless as if buried in a forgotten tomb.

These are the type of books that convincingly tell the nature and extent of the training required and the groundwork essential for its intelligent reception and assimilation. They contain much more than their titles would indicate and the reader can be assured of full value for their cost and the allocation of time for their study.

* * *

A Purchasing Manual

(*Continued from page* 114)

for future use.

All such activities should be studied carefully and held to a minimum to reduce the payroll and other expenses in connection with them. Emergency activities must have a time limit set and at the time limit, check shall be made to determine discontinuance.

Purchasing activities require alertness and application. Punctuality in attendance is an essential to accomplishment of the daily task in the working day. Absence from the department or from the desk should be arranged for and someone who will have a knowledge of the time of return of the Buyer shall be designated to receive telephone calls or visitors.

No manufacturing enterprise can long remain in business without an efficient, aggressive and well trained Purchasing Department. Such a Purchasing Department requires personnel with initiative and enthusiasm to do an outstanding purchasing job and well defined and established policies.

This manual has been prepared, therefore, as a guide for Purchasing activities and for the information of the several divisions and their departments. It is to be considered the basis of the Company's purchasing policy. As we cannot afford not to do an outstanding job of purchasing, it should be constantly referred to and every effort should be made to adhere to the fundamental policies contained therein.

K-68 . . . AN OUTSTANDING SHEET PACKING

K-68 gives outstanding results where unusual resilience must be combined with resistance to oil and to extremely high temperatures. K-68 sheets are made of specially selected asbestos fibres and bonded under great pressure with Neoprene.

K-68 sheets are recommended for aviation and Diesel engines and applications in oil refineries and chemical plants where they must stand up against solvent and aromatic conditions at extreme heat. Because K-68 contains no sulphur it is also valuable in refrigeration service.

For applications where the special characteristics of K-68 are not required, R/M offers a number of other sheet packings, among which are R/M Style No. 650, the famous "Pyroid" brand; R/M Style No. 670, which is approved by the National Board of Fire Underwriters.

For all your sheet or other packing needs see your authorized R/M distributor.

ASBESTOS TEXTILE & PACKING DIVISION

RAYBESTOS-MANHATTAN, INC.
MANHEIM, PA.

Style No. 686

R/M

RAYBESTOS R M MANHATTAN

It's "Packed with Satisfaction" when you use R/M

ILLINOIS
COIL
SPRING
COMPANY

Offers
Especially Prompt
DELIVERY—
Especially Good
VALUE—

ON ANY TYPE OF HIGH GRADE MECHANICAL SPRING
Sizes .005" to ½" Diameter Wire

REASON:— we have special automatic equipment that enables us to eliminate operations on many spring jobs—cutting costs materially—with faster, more uniform production. May we quote? Call or write . . .

TELEPHONE BERkshire 6461
2100 N. MAJOR AVE. CHICAGO 39, ILL.

The Buyer's Aesop

(*Continued from page* 141)

was still busy with the problem of public relations for purchasing, and he worried about how he could persuade the Sachem that buying was a profession. He was too worn out to eat the venison that his squaw had left for him in the ashes of the fire. So he took several slugs of fire water and fell into bed, from which he never arose, for his ulcers couldn't take it any more.

In the annals of the Sponduleks it is chisled that Whatscookin was the greatest purchasing agent the tribe ever knew. It is further chiseled that he was succeeded by Manana, under whose administration the war production program promptly fell apart, and within a few moons the tribe degenerated into a subsidiary of the Willowpoughkeepsies, who picked up the assets for a handful of wampum at a surplus property sale.

Morals Too much is as bad as too little. *And/or*: The brave who makes it his personal responsibility to make the world go round may not be around very long himself.

* * *

Maintain Free Enterprise

(*Continued from page* 87)

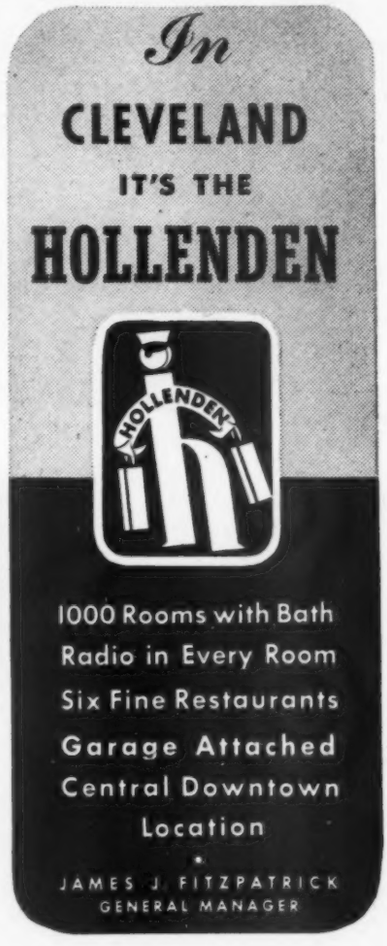
our population and double our land area, controlling the largest land army in the world today. Also, they have the most energetic foreign policy and a mighty internal effort striving to develop production facilities to support and expand their economy and influence.

In comparison, this continent enjoys higher standards of living, is the financial center of the world, has more technical knowledge and manufacturing potential than all the rest of the world combined.

In our intricate economy we must have leadership. We must choose it and help guide it, or it may develop along unsuitable lines and engulf us. A hundred years ago our great-grandparents could and did survive by themselves on their farms, but few farmers can do this today. They are dependent on the baker, the butcher, the power company and the telephone company for daily distribution of the things of life, even as

(*Continued on page* 346)

HORCO
Fabrics
CUSTOM MADE
To Your
REQUIREMENTS
If you require coated fabrics for specific applications, Hodgman will engineer them for you.
Such valuable properties as great fleibility, light weight, unusual toughness, resistance to stains, abrasion, extremes of temperature, and protection against moisture, deterioration and many chemical agents can be built to order in Horco Fabrics.
Hodgman's laboratory facilities and expert engineering service are available to you. Your inquiries are solicited.
HODGMAN RUBBER CO.
Framingham, Mass.



Have you investigated

the possibilities of

SuVeneer*

*Trademark Reg. U. S. Pat. Off.

CLAD METALS...

Your material requirements may reveal the need for Superior SuVeneer Copper Clad Strip, which provides a combination of the characteristics of copper and the strength and physical properties of steel.

Why not have a Superior development engineer work with you on some of your copper and copper-alloy clad metal applications, and demonstrate the economy, ease of fabrication and dependability of SuVeneer Clad Metals?

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

Maintain Free Enterprise

(*Continued from page* 344)

are those in the metropolitan areas.

A hundred years ago every man could be his own boss. Today we are a complex society out of which leadership can emerge without direction. This leadership can emerge in the form of dictatorship, or as monopolistic control. We must not let it simply emerge — we must choose and guide it.

As we know all too well, dictatorship, once it is established, cannot be altered by peaceful means. The State becomes all-powerful the individual must submerge self for the masses, and therefore he has no possible chance of expression or opportunity to remove unjust and unsound oppression. Various forms of of dictatorship have enjoyed a degree of success, but I suggest that they have achieved their dynamism through the stress of competition with other forms of government.

Should complete dictatorial world control ever be attained, disintegration would commence at once from relaxation and the lack of necessity to meet competition. This has been true industrially, and there is every reason to assume it would repeat that experience in respect to political or national vigor.

Monopolistic controls are bound to develop under a system of free enterprise and democracy. Men cannot even sit down together socially, without a tendency to discuss restraint of trade or enterprise. Monopolies can and do tend to be destructive. Few are ready to assume responsibility for full employment. Few will assume responsibility for any complete social security. There are, however, many monopolies serving the public as no competitive industry could possibly do. Try competition in the telephone service in your city, try it with your water service, or for almost any public service, and see how long you could take it. Definitely the monopoly has its place at least to this extent, but it should live only with the consent of, and be regulated by, our democratic federal or local government, and not be permitted to reach the point of its own sovereignty.

In the principle of free enterprise under a democratic form of government lies the fundamental basis for freedom of the world. It is only with the full exercise of our franchise that we can hope to control monopoly and hold dictatorship in check Through our eternal vigilance, and that of our fellow citizens, if we hope to perpetuate our way of life, we must control our nation and see to it that along with other free enterprise nations we guide the world to a democratic world order or State.

If we as Purchasing Agents will closely analyze our function, we must realize that we could not operate freely under state control. We could not secure our requirements as we do now; they would be allocated to us. We could not secure them *when* required, but would have to accept them when our allocations were made available to us. Neither could we secure them from the source of our choice; we must accept the source as planned. We could not voice an opinion as to price; we must accept the price as calculated according to the plan.

Dictatorship controls supply and demand. Bureaucratic controls, even as we experienced them during the past war, eliminate negotiation and so eliminate us. But if we are eternally vigilant, and work to maintain freedom in our dealings, we can perpetuate the system of free enterprise within which our profession can best serve the public and economic good.

NATION-WIDE SIGNODE SERVICE

. . . Steel Strapping for All Shipping Protection

You can depend on Signode Steel Strapping to give maximum protection to goods in transit from cartons and small boxes to heavy palletized units and carloads.

Forty-one branch offices — in eight major shipping areas — provide fast, nation-wide service on tools, steel strapping and seals — the basic elements in Signode's complete system of PLANNED PROTECTION for all types of shipping containers. The Signode SYSTEM cuts transit damage and helps to reduce shipping room expense.

Signode engineers will gladly offer specific suggestions in terms of your own packing and stowing problems. Write today!

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SIGNODE
STEEL STRAPPING

For trouble-free flow control ..... install POWELL Valves

Fig. 375—200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel bronze disc.

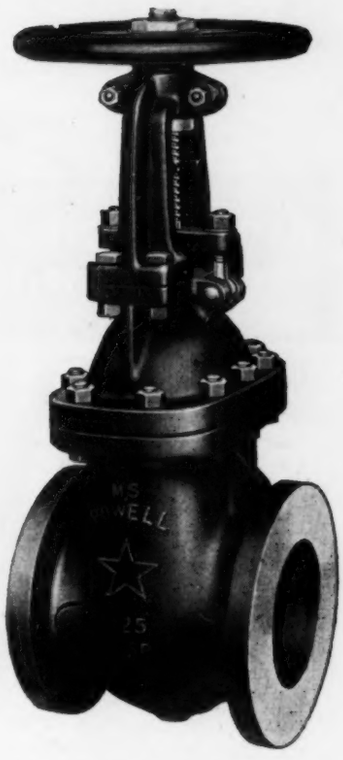


Fig. 1793—125-pound Iron Body Bronze Mounted Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke, bronze seat rings and taper wedge solid disc. Also available in All Iron.

There are at least two notable reasons why Powell Valves minimize flow control troubles. One is that every valve in the Powell Line has been scientifically designed to operate under certain specific flow control conditions—pressure, temperature and/or media. The other is that there's a Powell Valve for *every* operating condition, or set of conditions, known today.

That's why so many plants, representing every phase of modern industry, are now standardizing on Powell Valves.

Fig. 241—125-pound Iron Body Bronze Mounted Globe Valve with flanged ends, outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc. Also available in All Iron for process lines.

Fig. 150—150-pound Bronze Globe Valve with screwed ends, union bonnet and renewable composition disc.

Fig. 560—200-pound Bronze Regrinding Horizontal Swing Check Valve. Screwed ends, screwed-on cap and regrindable, renewable bronze disc.

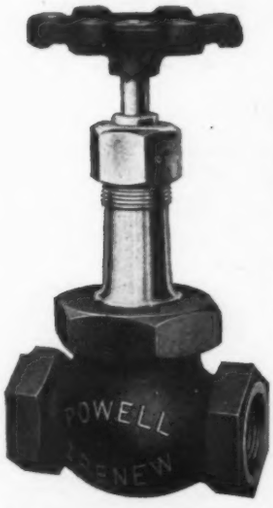
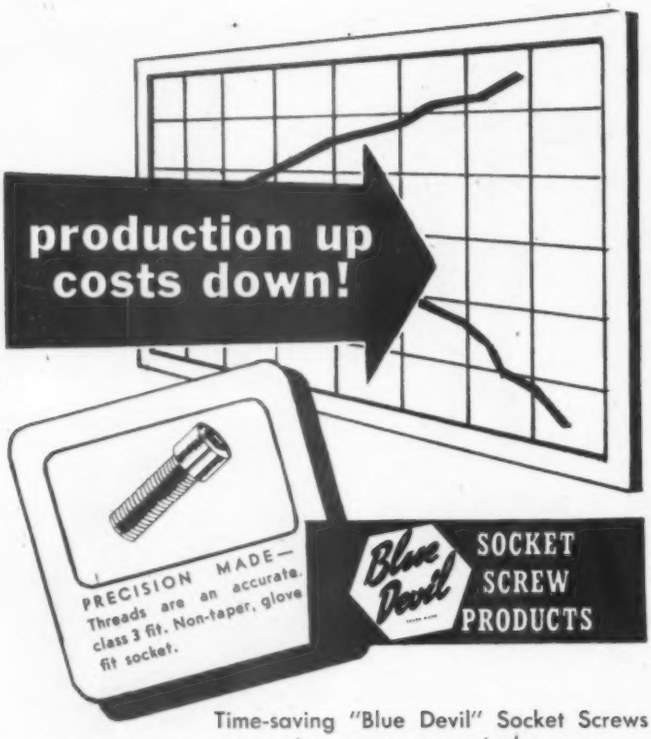


Fig. 190—150-pound Iron Body Bronze Mounted "Irenew" Globe Valve. Has screwed ends, union bonnet and regrindable, renewable wear-resisting "Powellium" nickel-bronze seat and disc.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES



Time-saving "Blue Devil" Socket Screws are easier, more economical to use . . . facts proved time and again in thousands of production lines, shops and toolrooms. "Blue Devil" Socket Screws make easy work of difficult installations—they cut costs and speed production everywhere!

For the most delicate precision instruments, for large, rugged machinery, for *any* job in which you want dependable screws whose performance has been proved, specify "Blue Devil" Socket Screws.

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Socket Screw Keys
Socket Pipe Plugs
Socket Set Screws
Socket Head Cap Screws
Socket Head Stripper Bolts

Safety Socket Screw Company
4440 N. Knox Avenue
Chicago, Illinois

Please send free catalog listing styles, sizes, prices and specifications of "Blue Devil" products.

Firm .....

Address .....

Attn. ..... Title .....

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HODELL
FOR QUALITY CHAIN

For 60 years Hodell has built dependability into every link of 157 varieties of welded and weldless chain. Throughout America, for every chain job, industry specifies Hodell . . . *to be sure.*

ESTABLISHED 1886
THE HODELL CHAIN CO.
CLEVELAND 3, OHIO

Design Engineers Specify

VALLEY
Ball Bearing
MOTORS

Because—

- They offer more flexibility in power planning.
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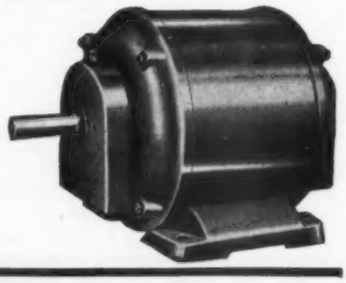

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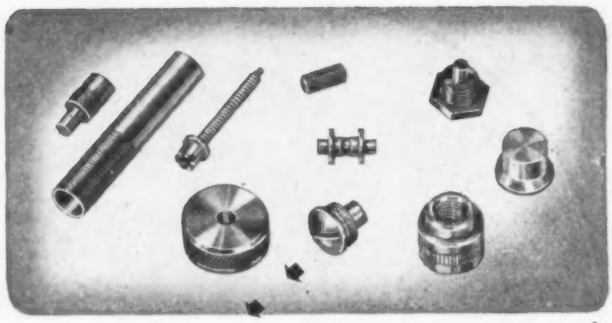

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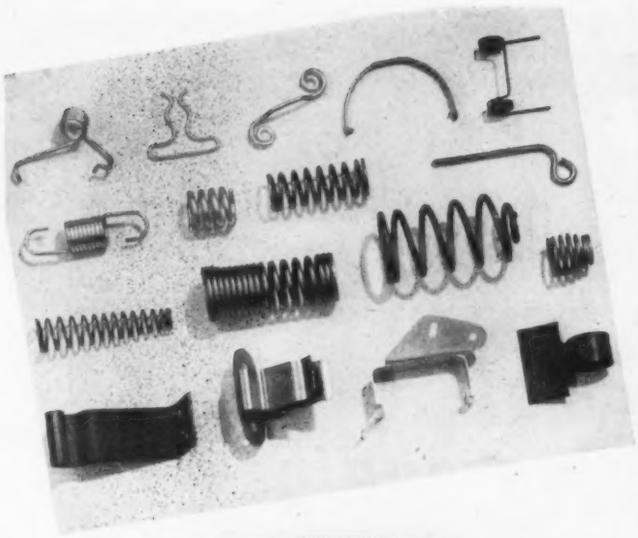

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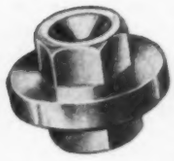

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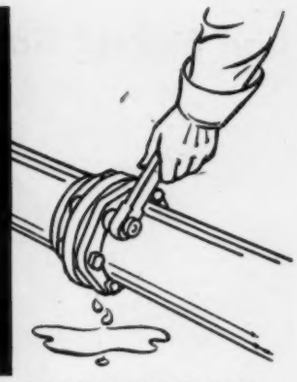

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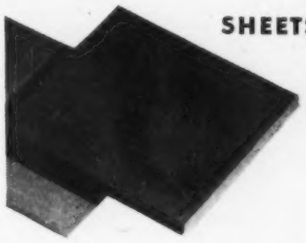

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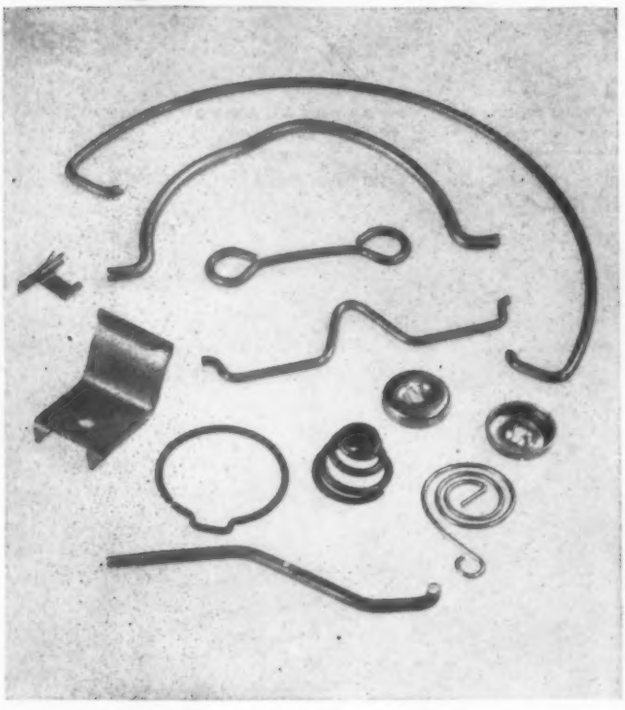

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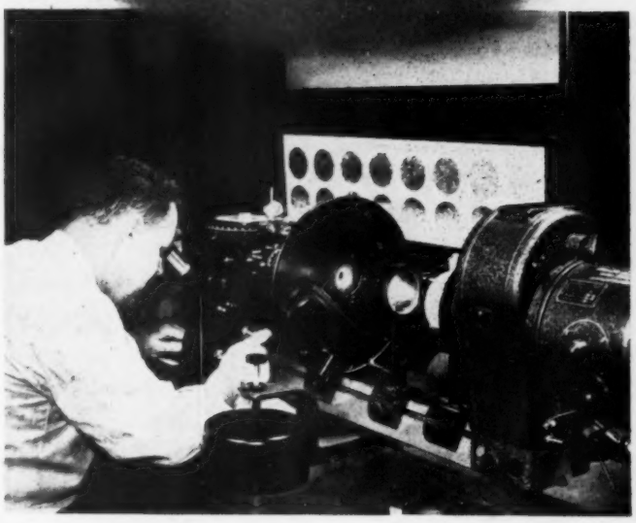

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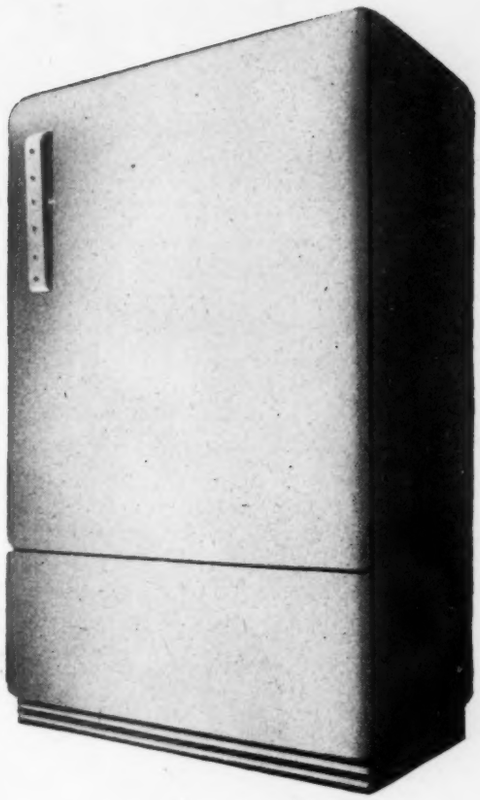

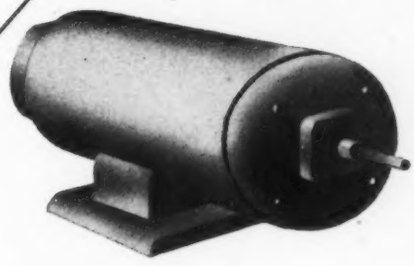

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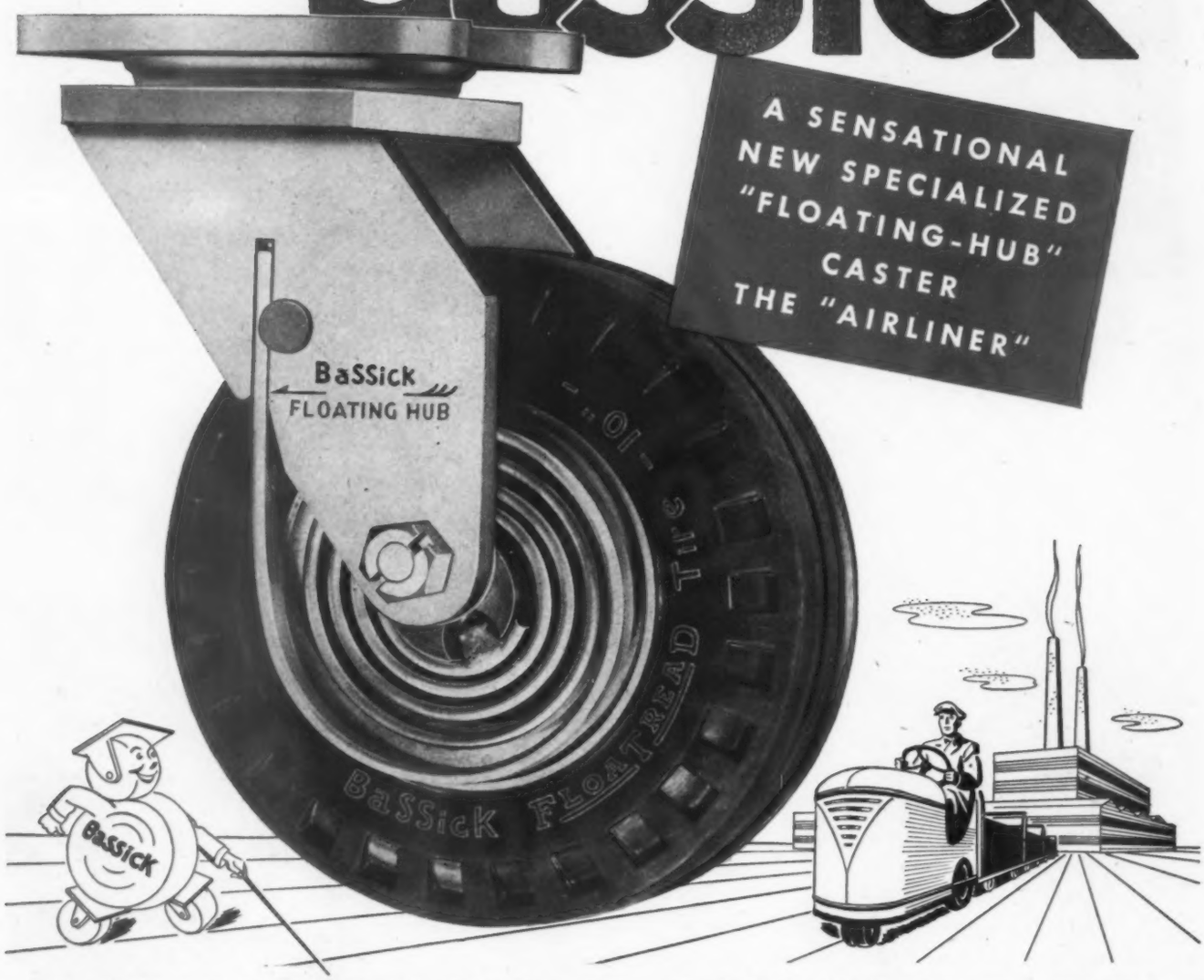

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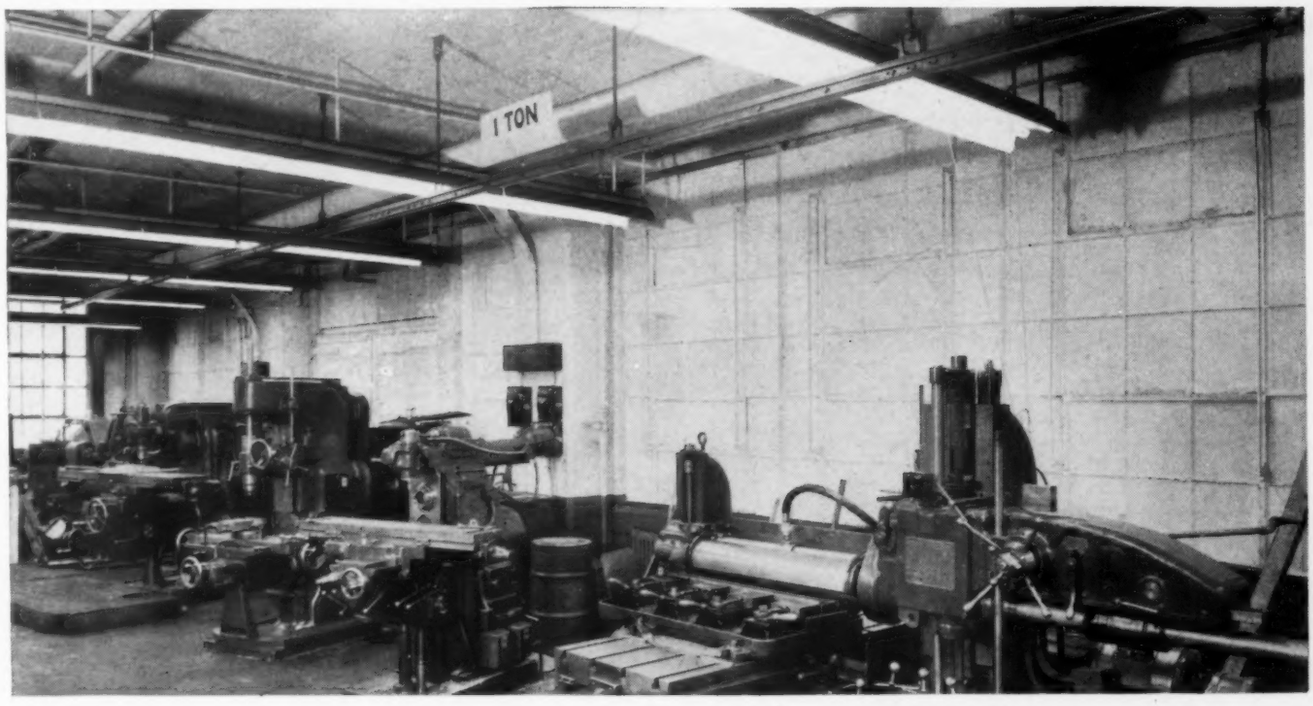

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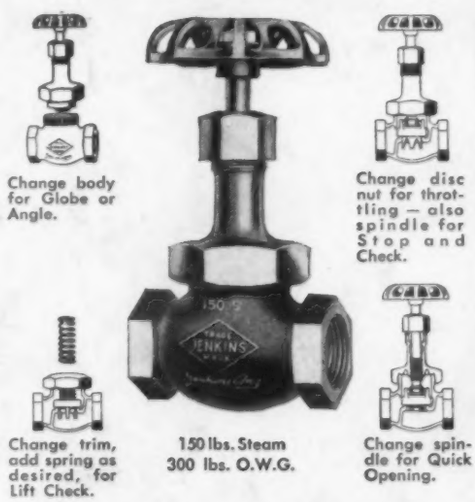
Change body for Globe or Angle.
Change disc nut for throttling — also spindle for Stop and Check.
Change trim, add spring as desired, for Lift Check.
150 lbs. Steam
300 lbs. O.W.G.
Change spindle for Quick Opening.

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